DOCUMENT RESUME

ED 211 714 CE 030 970

TITLE Examination of the Health Occupations Education Curriculum from a Futurist Perspective: II.

INSTITUTION City Univ. of New York, N.Y. Inst. for Research and Development in Occupational Education.; New York State Education Dept., Albany. Office of Occupational and Continuing Education.

REPORT NO CASE-14-81
PUB DATE [81]
GRANT VEA-53-81-1359-GS
NOTE 239p.; Some pages will not reproduce well due to weak print. For part 1 of this report see ED 198 296.

EDRS PRICE MF01/PC10 Plus Postage.
DESCRIPTORS *Allied Health Occupations Education; Certification; Clinical Experience; Competence; Competency Based Education; Computer Assisted Instruction; Computer Oriented Programs; *Curriculum Development; Curriculum Evaluation; *Educational Planning; *Educational Trends; *Futures (of Society); Health Personnel; Laboratory Equipment; Laboratory Technology; Postsecondary Education; Relevance (Education); Secondary Education; Statewide Planning; Two Year Colleges; *Vocational Education
IDENTIFIERS New York

ABSTRACT

A project was conducted to examine the health occupations education program in New York State. Through a series of committee meetings, members of the health professions and educators from high schools, colleges, technical institutes, and regional agencies discussed a number of issues that should be considered as the health occupations curriculum of the various institutions is periodically updated. Main issues addressed by the curriculum committee include the following: health occupations credentialing and licensure; technical competencies for health care workers of the future; new product development as it affects user training; support services and health occupations education; the future of the clinical laboratory; the use of computers in instruction; and competency based vocational education. (Reports by various committee members, as well as reaction from the field and summaries of committee discussion are contained in this report.) (KC)

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EXAMINATION OF THE HEALTH OCCUPATIONS EDUCATION CURRICULUM FROM A FUTURIST PERSPECTIVE: II

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Institute for Research and Development in Occupational Education
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In cooperation with the
OFFICE OF OCCUPATIONAL AND CONTINUING EDUCATION
Division of Occupational Education Instruction
The New York State Education Department

CASE #14-81

The program reported on herein was performed under VEA Grant #53-81-1359 GS.

CE 030 910

FOREWORD

The Institute for Research and Development in Occupational Education (IRDOE) has been closely linked with futuring activities for some time. A study of the bookkeeping curriculum in New York State in 1972-1973 indicated a need for revisions in that program of studies in order to bring the curriculum into closer articulation with the skills required on the job. This study led, indirectly, to the futuring project in business education, in which the Institute acted as facilitator. We have been pleased to continue to act in this role for the futuring project in the Health Occupations, reported on herein.

The rapid change in the practices and equipment available in all phases of allied health make it vital that this area be reviewed from a futuristic perspective. Similar concerns, of course, exist in other areas of occupational education. Interested readers who share our desire to keep occupational education curricula relevant to emerging practices in the work world are invited to exchange information regarding various issues addressed in this report.

Lee Cohen, Ph.D.
Director, IRDOE

ACKNOWLEDGMENTS

The role for the Institute for Research and Development in Occupational Education (IRDOE) in this project has been to facilitate the work of the Statewide Health Occupations Education Review Committee during the last year. The Institute had major responsibility for providing consultation and input to the Committee and to State Education Department staff regarding all phases of this project. In addition, IRDOE recruited speakers requested by the Committee to provide input to facilitate its deliberations. Meeting arrangements and administrative details required by the Committee were also coordinated by IRDOE. Finally, IRDOE had major responsibility for conducting two way dissemination of Committee activities. That is, by making presentations to selected professional meetings and by preparing a series of newsletters distributed by the Regional Observers assigned to the Committee IRDOE informed the educational community, employers, and other interested individuals regarding activities of the Committee. Reactions to the work of the project from the field were fed back to the Committee by IRDOE through the work of the Regional Observers.

This project has enjoyed the assistance of colleagues in a variety of facilities: The Center for Advanced Study in Education, the faculty and staff at the City University of New York and, of course, colleagues at IRDOE. Especially noteworthy has been the assistance of project associate Ms. Mara Zibrin who has been involved in all phases of the project, and coordinated the project dissemination activities. Mara has exercised her many responsibilities cheerfully, conscientiously, and with a high degree of competence.

Many other people contributed hard work, ideas, recommendations and suggestions which helped our work. Dr. Ruth-Ellen Ostler, Chief, Health Occupations Education Section, Bureau of Trade, Technical, and Health Occupations Education, has provided continuing support--far beyond what one could reasonably have expected. Her unselfishness in giving of her own time to all aspects of the Committee's work is gratefully acknowledged. Dr. Willard R. Daggett, Chief, Bureau of Occupational Education Program Development of the Office of Occupational and Continuing Education has given the Committee's work his active attention despite the fact that numerous demands were made on his time by the development of the new

unit. Mr. William J. Boudreau, Supervisor, Bureau of Occupational Education Program Development, has provided important liaison between the work of the Committee and the Futuring Project for the remaining Vocational and Practical Arts Education programs. The planning and organization of all phases of this project could not have been accomplished without his assistance. Dale M. Post, Director of the Division of Occupational Education Instruction assisted immeasurably in attending and speaking at various Committee meetings and supporting the conduct of this project. At a time of many new demands on his office and shrinking educational resources he has continued to demonstrate vision in his suggestions for this project. Assistant Commissioner for Occupational and Continuing Education Gerald L. Freeborne has supported futuring as a major planning tool in Occupational Education. In a time of cut backs, courage and wisdom were required for the support of these activities. Our project was fortunate that Commissioner Freeborne had both of these qualities in abundance.

Without the support of all of these individuals the project could not have been conducted. We thank them all.

Sigmund Tobias
Project Director

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Members of Statewide Health Occupations Education Review Committee

Committee Member	Institutional Affiliation	Representation
Thomas A. Castelli	Director, Occupational Ed. Rockland County BOCES 61 Parrott Road West Nyack, NY 10994	(1) Education: Occupational Ed. Director
Dorothy E. Fisk	Director, Health Programs Oswego County BOCES Adult Education Center 257 W. Fourth Street Oswego, NY 13126	(2) Education: Health Occupations Education Coordinator
Mary V. Wiles	Supervisor, Health Careers Coordinating Unit NYC Board of Education 131 Livingston Street Brooklyn, NY 11201	(3) Education: Health Occupations Education Coordinator
Edmund J. McTernan	Dean, School of Allied Health Professions Health Sciences Center SUNY at Stony Brook Stony Brook, NY 11790	(4) Education: Dean of Allied Health-4 yr. College
J. Warren Perry	Professor, School of Health Related Professions SUNY at Buffalo 712 Kimball Tower Buffalo, NY 14214	(5) Education: Specialist, Allied Health Ed. & Administration
August Tuosto	Vice President and Dean for Academic Affairs NYC Technical College 300 Jay Street Brooklyn, NY 11201	(6) Education: Dean/Adm. Allied Health-2 yr. College
Joan B. Penrose	Professor, New York Institute of Technology Balding House, PO Box 170 Old Westbury, NY 11568	(7) Education: Health Occupations Teacher Educator

Statewide Health Occupations
Education Review Committee (Con't.)

Committee Member	Institutional Affiliation	Representation
Stephen Bonnadonna	Vice President for Administration Nassau Hospital 259 First Street Mineola, New York 11501	(8) Large Scale Hospital Administration
Madaline Kerman	Administrator, Government Relations Blue Cross-Blue Shield of Greater New York 3 Park Avenue, 27th floor New York, New York 10016	(9) Major Health Insurance Company
James McCormack	Executive Director Health Planning Commission 99 Washington Avenue, TT Room 1683 Albany, New York 12237	(10) Medical Economica/Health Planning
Lindsay Robinson	President Northern Metropolitan Hospital Association 310 Fullerton Avenue Newburgh, New York 12550	(11) Employer: Large/Small Hospitals
Robert S. Graham	Vice President and Principal Medical Officer Medical and Personal Concerns Dept. Equitable Life Assurance Society 1285 Avenue of the Americas New York, New York 10019	(12) Employer: Opportunities in Industrial Health Centers
Sandra P. Benedict	Director, Patient Care Services NYS Health Facilities Assoc., Inc. 290 Elwood Davis Road PO Box 4938 Syracuse, NY 13221	(13) Employer: Nursing Homes
Richard A. Valente	Director, Team Programs Dentist's/Dental Auxiliaries Dental Office 4220 Harlem Road Snyder, New York 14226	(14) Employer: Dental Field

Statewide Health Occupations
Education Review Committee (Con't)

Committee Member	Institutional Affiliation	Representation
Leo Kogan	President, Mandl School for Medical and Dental Assisting 254 West 54th Street New York, NY 10019	(15) Education: Private Schools
Donna Ahnert	Teacher , Health Services Practical Nursing Institute Albany-Schenectady-Schoharie BOCES Mt. Pleasant Center Forest Road Schnectady, NY 12303	(16) New York State United Teachers and all HOE Teachers
Recorder		
Barbara Pickard	Professor and Chairman Department of Biology-Medical Laboratory Technology Hudson Valley Community College 80 Vandenburgh Avenue Troy, New York 12180	

Regional Observers to Statewide Review Committee

Regional Observer	Institutional Affiliation	Region Represented
John Thomas	Coordinator of Project PEERS Suffolk County BOCES #2 Brookhaven Career Center Martha Avenue Bellport, NY 11713	1-Suffolk and Nassau Counties
Vivian Broaddus	Assistant Principal Supervision of Health Careers Clara Barton High School 901 Classon Avenue Brooklyn, N.Y. 11225	2-NYC: Bronx, Brooklyn, Queens, Staten Island
Mavis Swire	Assistant Principal Supervision of Nursing Julia Richman High School 317 East 67th Street New York, N.Y. 10021	2-NYC, Bronx, Brooklyn, Queens, Staten Island
Beverly H. Delano	Coordinator, Health Occupations Education Ulster County BOCES Occupational Center Route 9W Port Ewen, NY 12466	3-Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester Counties Major City: Yonkers
Angelina Rivers	Coordinator, Health Occupations Education Albany City School District 470 Myrtle Avenue Albany, N.Y. 12208	4-Albany, Columbia, Fulton, Greene, Hamilton Montgomery, Rensselaer, Saratoga, Schenectady and Schoharie Counties Major City: Albany
Joanne Donohue	Director of Nursing North Country Community College 20 Winona Avenue Saranac Lake, NY 12983	5-Clinton, Essex, Franklin
Joyce Lemieux	Coordinator, Health Occupations Education Northwest Technology Center St. Lawrence County BOCES Park Street Ogdensburg, NY 13669	6-Jefferson, Lewis and St. Lawrence Counties

Regional Observers to Statewide
Review Committee (con't.)

Regional Observer	Institutional Affiliation	Region Represented
Athalie Wiley	Coordinator, Work Study/Job Placement Madison-Oneida Area Occupational Ed. Center Spring Road Verona, NY 13478	7-Herkimer, Madison, and Oneida Counties
Elaine Senn	Instructor, Dental Assisting Broome-East Tioga Occupational Center Upper Glenwood Road Binghamton, NY 13905	8-Broome, Chenango, Delaware, Greene, Otsego, and Tioga Counties
Julienne S. Webster	Instructor, Health Assisting Cortland-Madison BOCES McEvoy Educational Center Clinton Avenue Extension Cortland, NY 13045	9-Cayuga, Cortland, Onondaga, Oswego and Tompkins Counties; Major City: Syracuse
Josephine Colacino	Nurse Coordinator Wayne-Finger Lakes BOCES 3501 County Road 20 Stanley, NY 14561	10-Genesee, Livingston, Monroe, Seneca, Wayne, Wyoming, and Yates Counties; Major City: Rochester
Marilyn Lynough	Coordinator, Health Occupations Education Schuyler-Chemung-Tioga BOCES Pauline E. Bush Area Occupational Center 431 Philo Road Elmira, NY 14903	11-Chemung, Schuyler, and Steuben Counties
Mary Margaret Hahn	Coordinator, Health Occupations Education Erie County BOCES #1 2 West Pleasant Avenue Lancaster, NY 14086	12-Erie, Niagara, and Orleans Counties Major City: Buffalo
Marie Pavia	Instructor, Health Services South Cattaraugus Area Occupational Center RD #1, Box 424B Olean, NY 14670	13-Allegany, Cattaraugu and Chautauqua Counties

Regional Observers to Statewide
Review Committee (con't.)

Regional Observer	Institutional Affiliation	Group Represented
Kenneth Bessette	New York State Catholic Conference 11 North Pearl Street Albany, N.Y. 12207	New York State Catholic Institutions
Vivienne Batticks	Instructor, Eli Whitney Voc. High School 257 North 6th Street Brooklyn, N.Y. 11211	United Federation of Teachers/ New York State United Teachers

INTRODUCTION

Sigmund Tobias

The purpose of this project was to examine the Health Occupations Education Program in N.Y. State from a futurist perspective. Maintaining this perspective is especially important for the Health Occupations since changing procedures and the utilization of new technology have altered the practices and the duties of Health Occupations personnel dramatically in the past. They are likely to change them even more so in the future. The rapid progress of change in the Health Occupations makes it especially important that the competencies taught in such programs be examined so that educational programs prepare youngsters for the changing Health Occupations scene with the attitudes, knowledge, and skills required on the job.

This project was begun in April 1980 with appointment of the Committee. In addition, 14 Regional Observers were appointed for purposes of conducting two-way dissemination. That is, the Regional Observers were to inform the Committee regarding reactions in the field to its work and, in turn, inform health educators throughout the State about Committee activities. One vehicle of communication was a Newsletter which the Regional Observers disseminated to interested individuals in their region. Copies of the newsletter are reproduced in the Appendix.

Summary of Committee Activities for the Preceding Year

There were a total of three Committee meetings during the preceding year, plus an organizational meeting for the Regional Observers. During the year the Committee was addressed by futurists, specialists in human resources, and by a variety of individuals with expertise in areas verging on the Committee's concern. During that period the Committee developed preliminary suggestions regarding a restructuring of the Health Occupations Program.

The Committee also heard from personnel experts and from first-line supervisors of Health Occupations employees. These presentations provided important input to the Committee's preliminary deliberations regarding the areas of knowledge and competency clusters to be taught in Health Occupations Education programs.

A more detailed description of the Committee's activities during the preceding year from January until October 1980, can be found in the final report for that period.[1]

Summary of Committee Activities for the Present Year from April until October 1981

During the present year the Committee held a total of four meetings. The major topic of deliberation, the speakers, and other matters pertinent to each of these meetings will be described in the sections below.

Fourth Committee Meeting, December 11, 12, 1980

The Committee convened in Buffalo, N.Y. on December 11 and 12, 1980. This meeting was devoted to the Committee's consideration of issues dealing with

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[1] Examination of the Health Occupations Education Curriculum from a Futurist Perspective. Institute for Research and Development in Occupational Education, Center for Advanced Study in Education. The Graduate School and University Center of the City University of New York, 1980. CASE #26-80.

credentialing and licensure. The Committee was addressed by Dr. Benjamin Shimberg, Associate Director, Program Development Center for Occupational and Professional Assessment, Educational Testing Service; Dr. John Beckley, Director, Department of Allied Health, American Medical Associations; and by Dr. Robert H. Dougherty, Assistant Secretary, Commission on Dental Accreditation, American Dental Association. Mark Thomas, Counsel to the N.Y. State Senate Health Committee, spoke to the Committee regarding the legislative view of the credentialing problem. Copies of these presentations appear in this report.

At this meeting the Committee was also addressed informally by a number of speakers. These presentations were not prepared for dissemination and hence, are not in the present report. Among these presentations were comments by the following individuals: 1) Tom Sheldon, Coordinator of Profession Education Services, N.Y. State Education Department, 2) Robert K. Watt, Chief Health Planner of the N.Y. State Health Planning Commission, and 3) Martin Delscher, Director of Computer Services, Area 1 Board of Cooperative Educational Services.

The outcomes of the Committee's deliberations at this meeting are summarized in Newsletter No. 5, appearing in the Appendix.

Fifth Committee Meeting - March 19, 20, 1981

The Committee met in Syracuse, N.Y., for purposes of discussing the technical competencies to be required of Health Occupations Education program graduates. The Committee was addressed by three speakers with administrative and supervisory experience in health facilities, and by three representatives of companies manufacturing products for the health occupations. Among the supervisory and administrative speakers were Maureen Van Duser of the Crouse Irving Memorial Hospital in Syracuse, Janet Zhun Nassif, a consultant for health organizations, and Dr. Martin Rosenfeld, Assistant Dean, School of Allied Health, SUNY at Stony Brook. Speakers representing manufacturers included: Dr. Michael

Wardle, of the American Hospital Supply Corporation of Glendale, Cal., Dr. Marvin Margoshes, of the Technicon Corporation of Tarrytown, N.Y., and by Richard Tindall of the Syracuse Brace Company.

The results of this meeting are summarized in Newsletter 6 appearing in the Appendix.

Sixth Committee Meeting, June 3, 4, 1981

This meeting was preceded by a subcommittee meeting held in Albany during May 1981. The subcommittee completed deliberations regarding a number of issues which had not been resolved entirely at prior meetings. Recommendations from the subcommittee formed the basis for the project structure of the Health Occupations Education program which was accepted by the Committee at the beginning of this meeting. The projected structure is illustrated in Newsletter No. 7 in the Appendix.

The major purpose of this meeting was to discuss different curricular arrangements in which the competencies previously endorsed by the Committee should be taught. In addition, the Committee reviewed some instructional strategies considered optimal for Health Occupations Education training.

The Committee was addressed by a number of staff members of the New York State Education Department. Among these were Joseph Messier and Richard Jones of the Bureau of Occupational Education Program Development, Margaret Colins, of the Nursing Education Office, and Mildred Frandino of the Bureau of Business, Marketing and Distributive Education. Finally, Ruth-Ellen Ostler, Chief of the Health Occupations Education section, also spoke to the Committee.

Other speakers at this meeting included: Joan Penrose, a Committee member who is on the faculty of the New York Institute of Technology; Sigmund Tobias, Project Director and a faculty member at City College, City University of New York; and by Barbara Pickard, who acts as the Committee's consultant

recorder and is chair of the Biology-Medical Laboratory department at Hudson Valley Community College. In addition, a panel composed of Regional Observers chaired by Committee member Dorothy Fisk, of the Oswego County BOCES, addressed the Committee. The Observers on the panel included Mary Margaret Hahn, of Erie County BOCES No. 1, Elaine Senn, instructor of the Broome-East Tioga Occupational Center, and John Thomas, of Suffolk County BOCES No. 2.

The results of that Committee meeting are summarized in Newsletter No. 7 which is appended to this document.

Seventh Committee Meeting September 23, 24, 1981

On May 28 and 29 the N.Y. State Education Department initiated a futuring project reviewing a number of Occupational and Practical Arts Education programs. These programs included: Agricultural Education, Distributive Education, Trade and Technical Education, as well as Home Economics and Industrial Arts. One of the early topics of this larger effort, of which the Health Occupations Education Futuring project is a part, was to consider what the objectives of Occupational and Practical Arts Education are in general. Since the Health Occupations Committee had not addressed the problem of the general objectives for these areas, this meeting was devoted to a consideration of the objectives of Occupational and Practical Arts Education in New York State.

At this meeting the Committee also discussed the issue of whether supervised clinical experiences were to be required for the various Health Occupations Education programs. The Committee considered prior presentations regarding this issue, and discussed several position papers leading to considerable clarification of this important and complex topic. Final decision regarding supervised clinical experience will be made at the next committee meeting.

REACTIONS TO COMMITTEE ACTIVITIES FROM THE FIELD

Mara Zibrin

The Regional Observers consitute the communications network for the Health Occupations Education Futuring project throughout the State. During the past year the 14 Regional Observers who had been already active during the previous year covering the Occupational Education Planning Regions of New York State were joined by two more Observers representing the New York State Catholic Conference and the United Federation of Teachers.

The function of the Observers is to disseminate information regarding the Committee's activites to their constituents concerned with the work of the Committee, such as Health Occupations teachers and coordinators, employers, regional professional groups, etc., the Observers also bring back reactions from the field to the Committee.

The basic means of communication between the Observers and the field is a Newsletter published prior to each meeting which reviews the Committee's activities, provides information of upcoming meetings, and solicits reader input. The Newsletter is published centrally with the input of the Regional Observers and distributed in each Region by the Observer who is listed as the Editor for that area. This establishes the Observer as the local contact person for information and feedback.

During this year four issues of the Newsletter with between 3,100 and 3,500 copies per issue were disseminated throughout the State. The number of Newsletters distributed in the different regions ranged from 40 copies in the rural areas to as many as 1,000 in New York City. The Newsletters were sent to educators connected with health occupations in both the public and private sectors at the secondary and postsecondary schools, prospective employers of Health

Occupations Education graduates, appropriate local professional organizations, governmental representatives, news media, and other individuals or groups who might be interested in the program. Several hundred copies were also distributed by the Bureau of Health Occupations Education of the New York State Education Department to various central governmental organizations and state-wide professional groups.

In the period covered by this report the Newsletters asked for reader response to the preliminary version of the general competencies the Committee endorsed as necessary for all Health Occupations Education graduates, and for suggestions for technical competencies that the readers considered vital for entry level workers to have in their particular area of interest. The final Newsletter presented the diagram of the proposed structure of the Health Occupations Education and asked for reader reaction. Copies of all the Newsletters can be found in the Appendix.

While the rate of response to the Newsletter was low, varying from less than one percent to six percent from region to region, it was felt that the Newsletter was an important means of passing on information about the project. The reactions received indicated that readers in general supported the concept of the core competencies as they found that these constitute a foundation of knowledge and skills necessary for workers in all health areas.

Information about the project was also passed on by the Observers in telephone conversatons, and in speaking to local teacher groups, professional and special interest groups, and advisory councils. Members of the Institute for Research and Development in Occupational Education during the year addressed the Long Island Association of Vocational Education Administrators, the annual meeting of the New York State Health Occupations Association, a workshop on Futuring implications for educators in Suffolk County, and the meeting of the

Regional Planning Group for Occupational Education in Orange County.

The project expects to keep up a similar communication with the field during the upcoming final stages of the study. As recommendations for the Health Occupations Education program will be emerging from the Review Committee it will be vital to utilize the established channels of information exchange.

NATIONAL DEVELOPMENTS IN HEALTH OCCUPATIONS CREDENTIALING

Benjamin Shimberg
Center for Occupational and Professional Assessment
Educational Testing Service

Those concerned with planning health occupation careers for the 80's and 90's face the challenge not only of anticipating the nature of the demand for health services, but also the qualifications and characteristics of those who will be delivering those services.

From summaries of papers delivered by previous speakers it is clear that there are few illusions about the complexity of the task that lies ahead. People will be taking more responsibility for their own helath care. At the same time we are likely to become increasingly dependent on advanced technology and computers, especially in the institutional setting.

My task is to discuss how the credentialing system is likely to impact on health occupations delivery in the future. If we are to plan realistically we need to be aware not only of forces that support and facilitate changes, but also of forces that may pose barriers to change.

Most of us think of licensing and certification as consumer protection devices. They help the public to recognize practitioners who have met some standard and who are therefore presumed competent to deliver services. Such credentials have become so much a part of everyday life that the need for them and their societal impact are seldom questioned. Yet they can have a profound effect on the ability of trained individuals to deliver services in innovative ways. That is why health occupations planners cannot afford to ignore the potential impact of existing credentialing mechanisms on their plans for the future.

Some Terminology

There is considerable confusion, even among professionals, regarding the terms used to describe various credentialing mechanisms. Many occupations are licensed, others are certified or registered. What is the difference?

Licensing is the process by which an agency of government grants permission to an individual to engage in a given occupation. The license is usually granted only after an official body has ascertained that the individual has achieved the minimum degree of competency necessary to ensure that the public helath, safety,

and welfare will be reasonably well protected. Since the law establishing a licensed occupation usually sets forth a "scope of practice" covered by the law, licensing laws are often referred to as "practice acts."

Before a license is granted, the applicant must meet certain requirements set forth in the law. These usually include training and experience, minimum age, years of formal education or academic degrees, a period of residence within the state, and evidence of good moral character. As a rule, only those who satisfy these stated prerequisites are allowed to take the licensing examination.

Licensing is the most restrictive form of occupational regulation because it prohibits anyone from engaging in activities covered by the "scope of practice" without permission from a government agency. Among the health occupations covered by licensing laws in one or more states are the following: Acupuncturist, audiologist/speech pathologist, chiropractor, clinical laboratory personnel, dental assistant, dental hygienist, dental laboratory technician, dentist, denturist, dietician, emergency medical technician, hearing aid fitter, medical technologist, mental health worker, mid-wife, nurse practitioner, licensed practical nurse, registered professional nurse, nursing home administrator, occupational therapist, occupational therapy assistant, optical technician, optician, optometrist, pharmacist, pharmacist assistant, physical therapist, physical therapist assistant, physician (D.O.), physician (M.D.), physician assistant, podiatrist, psychologist, psychiatric assistant radiologic technologist/technician, respiratory therapist, sanitarian, social worker, and veterinarian.

Certification is the process by which a governmental or nongovernmental agency or association grants authority to use a specified title to an individual who has met predetermined qualifications.

Governmental Certification. As in the case of licensing, certification may be based on a law passed by some local, state or national governing body. However, unlike licensing, the law does not prohibit individuals from engaging in specified activities. It prohibits them from using a given title or from holding themselves out to the public as being "certified." For example, in many states anyone may practice accounting, but only those who have met state standards may call themselves "Certified Public Accountants." If a state certifies marriage counselors, anyone could offer advice to those excperiencing marital difficulties without running afoul of the law. However, only those who had met state standards would be allowed to advertise themselves as "certified marriage counselors."

Voluntary (nongovernmental) Certification. Many professional and trade groups have taken steps to grant recognition to individuals who are qualified in specialized areas of practice or who have attained entry level or superior competence in the broad areas of responsibility of a given occupation. While all physicians must be licensed by the state before they can practice, those who meet standards set by nongovernmental certification agencies may be recognized for their competence in various fields of specialization. The American Board of Internal Medicine, for example, certifies physicians who pass its examinations and meet other requirements. The certificate is often called a "diploma" and those who receive it are colled "diplomates." There are at present 23 medical specialty boards. None of these are based on any law. They represent a voluntary effort on the part of occupational groups to grant recognition to those who have achieved a required degree of knowledge and skill in a given field.

In 1976, a nongovernmental commission was established to set standards for voluntary health certifying agencies. Calling itself the National Commission for Health Certifying Agencies, (NCHCA) the body has established rigid standards for those wishing to gain recognition. As of September 1980, only six certifying agencies had been recognized by the commission. Nine others Had been granted "conditional" recognition.

Registration is a very general term. It may mean title control, as discussed above, or it may simply mean that the law requires all individuals who wish to engage in a given occupation to register with a designated government agency. Registration usually involves only listing one's name and address and payment of a fee. Seldom does the law require the applicant to pass an examination or show that he or she has met predetermined standards. Thus, while RN's are called "Registered Nurses" they are in fact licensed. Engineering laws frequently refer to "Registered Engineers," but these, too are licensed.

Registration is used in situations where the threat to public health, safety, or welfare is minimal. It is frequently used by municipalities to regulate possible "fly-by-night" operators, such as door-to-door salespersons or operators of games of chance at carnivals.

Since licensing is clearly the most restrictive mode of occupational regulation and is likely to have the greatest negative impact on the health care delivery system, it will receive major attention in this paper.

Evolution of Licensing

In order to understand how the present licensing situation developed, it is necessary to go back to the middle of the last century when there was no regulation of physicians or other health care personnel. Anyone could call himself or herself a doctor and practice medicine. This bothered the better trained physicians. Not only was their own image tarnished by the shoddy work of incompetents and charlatans, but they also saw the harm that unqualified practitioners were doing. In an effort to remedy the situation, these better trained physicians formed medical societies. They set fairly high standards for admission, adopted codes of conduct, and specified grounds for dismissal from the society. While quacks and charlatans could not get into these societies, that fact did not prevent them from continuing to practice. Indeed, when a member physician was ejected from the society for incompetence or unprofessional conduct, he or she could go right on practicing as if nothing had happened.

Recognizing that the voluntary approach was not working, leaders of these early medical societies asked their state legislators to invoke the police power of the state to prevent unqualified physicians from practicing. State legislatures passed laws making it illegal for anyone to practice medicine or the "healing arts" unless they had been granted a license to do so by the state medical board. The board was given authority to set entry qualifications, administer tests, establish practice and conduct standards, carry out investigations about alleged incompetence or wrong doing, and take disciplinary action against those proven guilty.

It was only natural that the legislators would ask leaders of the societies that had sought the licensing legislation to serve on the boards. Thus began the tradition of self regulatory boards. Members of the occupational group were expected to set standards and to monitor the activities of practitioners. Under this arrangement, there was no place for lay persons or public members. After all, what could they contribute to evaluating qualifications, setting standards, investigating complaints, or deciding disciplinary cases? Thus, licensing boards came to be dominated by members of the regulated group. Only occasionally were other professionals included, such as placing a physician on a nursing board, or an engineer on a plumbing board.

Because these early boards were performing a unique function in the public interest, legislators usually granted them a high degree of autonomy. As a rule,

they were not attached to one of the existing departments of government. They were usually given full responsibility for administering the licensing law and were made accountable only to the legislature. This meant that boards could make up any type of examination they saw fit. They could adopt rules of conduct that had the force of law. And they could suspend or revoke the licenses of those who violated the law or the board's own rules. Practitioners who were dissatisfied with a board's decision could appeal in the courts, but that was usually a costly and time-consuming matter.

Shortly after the turn of the century, other groups began to clamor for regulation. They, too, saw it as a way to get rid of incompetents and to improve the group's image. Those seeking licensure usually asked for and were granted self regulatory powers and a high degree of autonomy, similar to that previously granted to physicians.

Economic Benefits of Licensure for the Regulated Group

As one might expect, some members of trade and professional groups recognized the potential economic benefits of licensing. By raising entry standards one could restrict the number of practitioners in an occupational field. Those who were licensed would thus benefit from the scarcity which higher standards may have created. The public had no choice. It could only obtain services from licensed practitioners and when practitioners were in short supply they could charge whatever price the market would allow. Small wonder that many groups sought to become licensed. From a mere handful of occupations licensed at the turn of the century, the number has grown to more than 800 as America entered the decade of the eighties.

I do not want to belabor the matter of exclusionary standards and excessively difficult examinations. Groups that pursued such practices were probably in the minority, but in recent years evidence has come to light that some boards did misuse their powers to restrict entry.

Some boards also used their powers to restrict mobility. Persons might be licensed in one state, but find it impossible to get licensed in other states to which they might wish to move. Certain states entered into reciprocity agreements, each one agreeing to honor the licenses issued by the others. However, many occupational groups resisted such agreement on the grounds that standards in other states might not be as high as their own and that this might allow unqualified

individuals to practice. Another reason for resisting reciprocity may have been a desire on the part of the occupational group to resrtict the number of practitioners. Whatever the reason, licensing eventually came under attack as a device that had, on ocassion, been misused to unfairly restrict mobility and skilled workers and professionals.

Another attraction of licensure for certain groups was its potential for restricting competition. As groups achieved licensed status, many of them adopted the codes of conduct that had been accepted as ethical practices by the voluntary associations or societies. For example, a society of optometrists or pharmacists might have decreed that it was unethical to advertise prices. When such groups became licensed, they often adopted these same ethical standards as rules of professional conduct. Such rules, adopted in accordance with statute, had the force of law. Whereas the failure of a pharmacist to adhere to a society's ethical code might, in the past, have resulted in expulsion from the society, it could now result in the suspension or revocation of the pharmacist's right to practice.

Licensing came to be preceived by some as a way of imposing certain codes of conduct on all practitioners. To the extent that conduct codes protected the consumer, they were clearly in the public interest. But when they restricted competition for the benefit of members of the occupational group, their legitamacy could properly be called into qauestion. In recent years, the courts have ruled that prohibitions against truthful advertising are a violation of the First Amendment. As a result many groups that formerly prohibited price advertising now permit it.

Administrative Structure of Licensing

As the number of licensing boards increased, several different administrative patterns evolved. Initially, most boads were free-standing and completely autonomous. They were responsible only to the legislature. A recent survey by the Council of State Governments' revealed that 19 states still follow this pattern.[1] Seven other states have established central agencies to provide housekeeping services for boards, but the boards remain highly autonomous and have full decision making power. In the remaining states, the central agencies excercise varying degreesd of control over board activities. In 18 states, for example, the central agencies have control over board budgets, personnel and records. They may handle investigations for the boards, even though boards may have the final say with respect of many policy matters. In six states the powers of boards have been

limited to an even greater extent. In four of these, most board decisions are subject to review by the central agency. In two, boards are strictly advisory. All decision making power is vested in the central agency.

It is understandable that boards would want to preserve as much autonomy as possible. Most groups take a highly possessive attitude toward licensing. Leaders of occupational groups often refer to their licensing statute as "our law" and they seem to resent any efforts by "outsiders" to interfere with the free exercise of the authority granted by the law.

Territorial Conflicts

As we noted earlier, licensing lawes are called "practice acts" because they usually set forth the practices that fall within the scope of the license. It is illegal for anyone not licensed to engage in any of the activities specified in the scope of practice. Thus, dentists have complete control over everything that goes on inside a person's mouth, except activities performed by a licensed physician. In order for dental hygienists to practice legally inside the mouth, they had to obtain a practice act of their own. But they could only obtain such legislation with the approval of the dental profession. Because dentists excacted a high price for their approval, dental hygienists now find themselves totally subservient to dentists. Although they undergo rigorous training, they are allowed to clean teeth only in a dentist's office and under the supervision of a dentist. In every state the licensing of dental hygienist is handled by the dental board. Dental hygienists are usually not represented on these boards. Even in states where board members are elected by a vote of the dental association membership, hyienists are not allowed to participate in the election process.

Another group that has sought to encroach on the dentists' "territory," are the denturists. Those are the laboratory technicians who make false teeth from impressions taken by dentists. In a number of states, these technicians sought to earn some extra income by taking the impressions themselves and then making false teeth for poeple. By eliminating the middle man denturists were often able to provide false teeth at half to one third of the price charged by dentists. Dentists obtained injunctions against those engaging in these activities. They did not have to show that the false teeth prepared by denturists were of inferior quality or that anyone had been harmed. They only had to show that the denturists were breaking the law by trespassing on their territory.

In defense of their actions, denturists pointed out that Canada has allowed independent practice by denturists for nearly a quarter century without any harmful effects and that many European countries permit technicians to fit false teeth. However, when denturists tried to get state laws changed, they ran into strong opposition from the dental profession which was able to persuade legislators that it would not be in the public interest to allow independent practice by denturists. The latter charged that dentists were less interested in protecting the public than in protecting their own economic interests, since the fitting of dentures is a lucrative source of income for many dentists. The views of organized dentistry prevailed. In every state were denturists tried to get the law changed, their efforts were rebuffed by legislatures. In Oregon, however, a citizens group organized a campaign to place the matter before the public in the form of a referendum. Despite vigorous opposition and the expenditure of substantial sums by organized dentistry, the public supported the idea of independent practice by denturists by a three to one ratio. Thus far, Oregon is the only state where denturists have managed to gain the right to practice independently of dentists.

The case of the denturists is a scope of practice controversy that has attracted public attention, but most such controversies are argued in board meetings and at legislative hearings. They attract little public attention. Nurses have been working quietly, and with some success, to enlarge their scope of practice and to gain greater independence in the delivery of nursing services without the intervention of physicians. However, efforts by many other health service delivery groups to undertake activities for which they had been trained have met with resistance from licensed professionals who seemed determined to protect their turf.

An example of such resistance may be seen in a report from California concerning dental auxiliaries. In 1974, following extensive hearings, the California legislature passed a Dental Auxiliary Act "to permit the full utilization of dental auxiliaries to meet the dental care needs of all the state's citizens." The law established four new categories: registered dental assistant; registered dental assistant with extended functions; registered dental hygienist; and registered dental hygienist with extended functions. The act described the scope of practice of each category in general terms and instructed the Board of Dental Examiners to prescribe by regulation the precise functions which may be performed by each level of auxiliary and the settings in which such functions could be performed. The legislature also established a Committee on Dental Auxiliaries to develop

recommendations regarding appropriate scopes of practice. These were to be acted on by the board within 60 days of adoption by the committee. Four years later the sponsor of the legislation held hearings to determine how well the Dental Auxiliary Act was working. He found that no clinical training programs had been approved. No exams had been developed to license auxiliaries. Not a single auxiliary in extended functions had been registered. At the hearing, the chairman of the state Board of Dental Examiners stated that:

> Licensure at this level will not begin until the board has been thoroughly able to evaluate the impact and effect on delivery of dental care by expanded duties at the dental assistant, and registered dental hygienist level. When the board is convinced that the appropriate educational foundation has been established and it is in the public interest to begin licensing this level of auxiliary, further action will be taken.

When asked by a consultant to the legislative subcommittee what procedures the board was using to evaluate the impact of the Dental Auxiliary Act, the chairman replied that no mechanism for evaluation had been set up.[2]

While the foregoing may be an isolated example drawn from a single profession, it nevertheless illustrates how a profession may use the licensing apparatus to override the intent of the legislature when it disagrees with the social value of the mandated change or when it perceives that change could have an adverse economic impact on its members. Implementation of the Dental Auxiliary Act commenced only after Governor Brown had altered the composition of the board through use of his appointive powers.

Resolving Controversies

Nearly every proposal to modify scopes of practice or authorize the use of auxiliaries generates controversy. Legislators are called upon to decide which of the proposed changes are sound and which are too risky to be legally sanctioned. Most legislators lack the expertise to decide such technical questions. Moreover, they are often faced with conflicting testimony from experts. The group seeking expanded functions is likely to present expert testimony to the effect that the proposal is safe and in the public interest, while opponents will present their own experts counseling caution and warning of potential harm to the public if the proposed changes are adopted.

One way to resolve such controversies is to seek objective evidence about the

safety of a given practice rather than relying exclusively on the judgment of experts. But how can one obtain such evidence as long as it is illegal for nonlicensed personnel to perform the activities in question?

The California legislature found a way out of this dilemma by passing the Health Manpower Pilot Projects Act (HMPP) in 1973. The purpose of HMPP was to provide a way to try out and evaluate new and expanded health roles.

The HMPP law authorizes the Office of Statewide Health Planning and Development, situated within the State Department of Health, to approve projects which would train, utilize, and evaluate new or expanded roles of health workers. The objective of the legislation is to "improve the effectiveness of health care delivery systems" by utilizing "health care personnel in newe roles and to reallocate health tasks to better meet the health needs of the citizenry."

The act enables the scope of practice of existing categories of workers to be expanded beyond current legal definitions. Although students in approved projects are exempted from certain healing arts licensing laws, they are held to the same standards of care as required of persons currently licensed to provide such care.

The evaluative aspects of the program are concerned with the safety of the care providers as well as with the impact that these new skills are likely to have on the quality and availability of health workers if the legislature makes recommended changes in existing law. To date, changes have occurred in laws relating to the practice of registered nurses, dental auxiliaries, and physician's assistants.

Since 1973, the HMPP program has undergone a number of changes. A 1975 amendment required the program staff to seek the advice of appropriate healing art boards prior to approval of HMPP proposals. A limit of two training cycles (24 months) was placed on projects, although some might be continued beyond that period "if they are deemed likely to contribute substantially to the availability of high quality health care services in the state or a region thereof."

In 1977 the act was further amended so that registered nurses, physician assistants, and pharmacists could be authorized to prescribe, dispense and administer drugs. The number of groups that may apply for HMPP approval was expanded to include veterinary, chiropractic, podiatric, geriatric care, therapy personnel, and health care technicians.

Since enactment of HMPP, 138 projects have been submitted for consideration. Each applicant had to specify the tasks that trainees would perform, the training facilities, institutional resources, faculty, and how the

institution planned to evaluate its trainees in using the expanded functions. Approximately 100 project applications have been approved, but many of these were never implemented. As of May 30, 1980, 26 projects were underway. These provide for expanded roles for registered nurses (prescribing/dispensing medication, utilizing acupressure), expanded roles for physician assistants and emergency medical technician II, pharmacists, dental assistants, dentists learning new roles in administering anesthesia, and lay persons preparing for the provision of women's health care.[3]

At the national level, the Federal Trade Commission (FTC) has also initiated a process that will provide decision makers with objective data instead of opinions that may be colored by self interest. A good example of the FTC approach may be seen in the vision care field. Prior to 1979, the FTC had focused its attention on anti-competitive practices, such as prohibitions against price advertising by licensing boards.

In the past few years the FTC has shifted its attention to scope of practice restrictions and form of practice restrictions. In the scope of practice area, the FTC is examining restrictions which limit certain procedures, such as the fitting of contact lenses, to physicians and optometrists. The FTC is attempting to determine whether opticians should be permitted to provide these services in competition with these other providers.

In some states, dispensing opticians are permitted to fit contact lenses. In other states, however, opticians are not legally permitted to fit contact lenses or may do so only under the supervision of an ophthalmologist or optometrist. Proponents of this restriction argue that opticians are not competent to fit contact lenses because few states license opticians, thereby minimizing state control over who may practice in this area; and, in addition, that few opticians have completed formal courses of education in contact lens fitting.

The FTC's "Contact Lens Study" is designed to provide information about the prices charged and quality of contact lens fitting provided by opthalmologists, optometrists and opticians. To obtain objective data on which to base conclusions, the FTC contacted and received the cooperation of the various segments of the eye care delivery system in determining standards to measure quality. The study attempts to answer the question of what constitutes a successful or unsuccessful contact lens fitting. The FTC managed to obtain substantial, if not perfect, agreement on this question.

As the next step, the FTC identified a large population of contact lens

wearers who had been fitted by different providers. Some had been fitted by ophthalmologists, some by optometrists, some by opticians. Each of the contact lens wearers who agreed to participate in the study was examined by an expert from each of the three practitioner groups. The examiners were given special instruction in how to apply the criteria. At this writing, data collection is still in progress.

When the data have been analyzed, the Commission will have the factual information necessary to make a determination as to what action, if any, is appropriate. The FTC will decide whether there is a basis for federal regulation, whether there might be a basis for joint state and federal action, or whether the determination should be made entirely at the state level. In any event, FTC plans to make its findings available to state legislators so that they will have objective data to consider along with the more subjective recommendations of various professional groups.

The contact lens study is only one of several that the FTC is planning through which they hope to examine scope of practice restrictions among health care providers. One study in the dental field deals with the role of denturists in the dental care delivery system. Here, as in the contact lens situation, an effort will be made to judge the quality of denture fittings.

In its study of "form of practice" restrictions, the FTC is looking at laws, ethical codes, and similar constraints on the way in which professionals may do business. For example, in the eye care field, many states prohibit the "commercial practice" of optometry. A department store might be prohibited from employing an optometrist, or a group of optometrists might be prohibited from establishing a chain with a common corporate name. The primary justification for such restrictions is that high volume practice and the use of corporate names, which obscure the name of the licensed professional, may lead to an inferior quality of service.

To ascertain whether such allegations have substance, FTC's Bureau of Economics (BE) conducted an extensive shopper survey of optometric services by purchasing eye examinations and eyeglasses in various market settings.[4] BE sent trained observers into the field to purchase eye examinations and eyeglasses in markets where restrictions on form of practice exist and also in nonrestrictive markets. The BE study compared prices as well as quality by examining the thoroughness of the eye examination, accuracy of eyeglasses prescription, accuracy and workmanship of eyeglasses dispensed, and extent of unnecessary prescribing of eyeglasses between optometrists in the commercial setting and the non-

commercial setting.

The study found that the "total price for eye exmination and eyeglasses are significantly lower in the least restrictive cities. Large chain optical firms, advertising optometrists, and even nonadvertising optometrists all charge less in these cities than optometrists in the most restrictive cities."

As for quality, "examinations purchased from optometrists in restrictive and nonrestrictive cities are, on average, of about equal thoroughness. (However,) examinations purchased from large chain firms and advertising optometrists are, on the average, less thorough than examinations purchased from nonadvertising optometrists in nonrestrictive cities." The report concludes that the differences in the "thoroughness index" is statistically significant, but does not state whether this difference in thoroughness has practical implications for consumers.

The accuracy of prescriptions from advertising optometrists and chain firm optometrists were "no less appropriate" than those from nonadvertising optometrists. The accuracy and quality of workmanship of the eyeglasses were also found to be about the same for all groups. Moreover, neither advertising optometrists nor optometrists employed by large chains tended to unnecessarily recommend new eyeglasses more frequently than nonadvertising optometrists.

Form of practice restrictions which restrict the growth of alternative delivery systems are found in other fields as well. The FTC's San Francisco Regional office is examining ownership and form of practice limitations which affect dentists. For example, does the quality of dental work suffer in higher volume operations as compared with the quality of care provided by the solo practicing dentist?

These studies by the FTC seem to represent a shift by that agency from a strategy of compiling voluminous anecdotal documentation regarding anti-competitive practices and other abuses in various occupational fields, to a strategy of compiling objective comparative data on the efficacy, cost effectiveness and quality of care provided by different delivery systems and alterntive providers of care, both in the health care and non-health care fields.

If these studies are methodologically sound, the findings are likely to provide a basis for reexamining and perhaps reformulating some of the existing laws, rules and policies that presently govern scope of practice and form of practice. Failure by boards to act would almost certainly throw the issue into the legislative arena where controversy would focus not only on restrictive rules, but also raise questions regarding the capacity of practitioner-dominated boards to adequately

serve the public interest.

All such changes, whether stimulated by state experimental projects or by federal agencies, are likely to have implications for curriculum planners, health educators and those who manage health care delivery systems. These changes will determine what types of personnel they may employ to do what jobs, how much flexibility they will have in the employment of staff, and how much it will cost to provide quality services.

Role of Certification

Earlier in this paper, a reference was made to voluntary certification as an alternative to statutory regulation. A weakness of voluntary certification is the absence of standards. Any group wishing to establish its own certification agency is free to do so. It can issue credentials that represent a high level of attainment, as is the case with medical specialty boards, or it can issue credentials that involve no demonstration of competency whatsoever. There is no state or federal regulation of nongovernmental certification agencies, thus there is no way of knowing how much credence to place in a certification credential without also knowing how trustworthy the certification agency is and what standards it applies in awarding its credentials.

In an effort to bring some order and stability into the health credentialing field, the Department of Health, Education and Welfare sponsored a study to explore the feasibility of establishing a nongovernmental entity that would accredit health certifying agencies. These studies finally led to the creation of a National Commission in Health Certifying Agencies (NCHCA). The NCHCA functions like an accreditation body in that it evaluates certification agencies, but does not itself do any certifying. The NCHCA has adopted rigorous criteria for acceptance. For example, certifying bodies associated with professional association must show that they are not under the domination of the association. In many instances this means changing the by-laws of the association to give the certifying group fiscal independence and complete freedom in the selection of its own board. The NCHCA has established guidelines regarding the construction, use, and interpretation of certifying examinations. In a recent action, the Executive Council of the Commission adopted guidelines relating to the establishment of passing scores in order to insure fairness and equity in making pass/fail decisions.

In the three years since its foundation, only six certification agencies have

met all of the membership requirements and been accorded full membership status. These are:

Board of Registry of the American Society of Clinical Pathologists

Commission on National Dental Examinations of the American Dental Association

Dental Assisting National Board

National Board of Chiropractic Examiners

National Board for Respiratory Therapy

National Commission on Certification of Physician's Assistants

Nine other certification agencies have been accorded "conditional membership." Conditional membership signifies that the group has met most but not all of the basic requirements. Once the deficiencies have been removed, the groups will be considered for full membership. Conditional members of NCHCA are:

Certifying American Association of Medical Assistants

American Board for Certification in Orthotics and Prosthetics

American College of Nursing Home Administrators

American Dietetic Association

American Medical Record Assocition

American Medical Technologists

National Registry of Microbiologists of the American Society for Microbiology

National Certification Agency for medical Laboratory Personnel

Nuclear Medicine Technology Certification Board

The efforts of NCHCA to bring order and credibility to the field of health credentialing merit the support of health educators, leaders in the allied health professions, consumers, employers of health personnel, and legislators seeking to diminish the role of government in the health field.

Leaders of NCHCA point out that this organization represents an opportunity for groups involved in the delivery of health services to take an active role in determining their own futures. They note that voluntary certification avoids most of the artificial restrictions that are imposed by state licensure laws. Instead of setting minimum standards as is done in licensing, the certification agency can set standards which stress excellence. Failure to meet the certification standard would not necessarily deprive individuals of an opportunity to work, but it might prevent such individuals from getting the best jobs. Thus, certification could provide an incentive for practitioners to seek additional training and experience in order to meet certification requirements. From the health service employer's perspective, the emergence of NCHCA represents a major brakthrough. In the past, employers were often unable to evaluate an applicant's credentials unless they were familiar with the organization that issued them. Given the multiplicity of organizations certifying health personnel, this was often an impossible task. With NCHCA now accrediting certification agencies, the employer can rely on credentials issued by an NCHCA member organization with considerable confidence.

As one looks to the future there seems little likelihood that the amount of health personnel credentialing will diminish significantly. In all likelihood it will increase as new groups emerge and clamor for the status which licensing and certification connote.

Judging from the success of recent efforts to halt the proliferation of newly licensed categories, it seems reasonable to assume that the growth of credentialing will occur in the voluntary sector. Such growth will be accelerated by demands of insurance companies and other third party payors for assurance that those providing services are, in fact, qualified to render them. If legislators continue to resist new requests for licensure, health service delivery groups are likely to turn to voluntary certification as the logical alternative.

The federal government also has an interest in the development of a strong voluntary certification program, one that provides a reasonable expectation that services will be of high quality. A number of federal officials associated with the Health Resources Administration have indicated that they lack confidence in the existing system of state licensure as a quality assurance mechanism. They point out the great variability in licensing standards from state to state and question whether licensure can be relied on as a measure of competence. Several years ago, a report issued by HEW suggesed that at some time in the future licensure per se might no longer be sufficient to qualify a provider for reimbursement under

federally funded health programs. It was proposed that in order to be eligible, the provider woud have to show that he or she had been certified by an agency accredited by some national group such as NCHCA. While this proposal was deleted from the final report[5] following loud protests from professional associations, it may re-emerge in the wake of growing concerns about the cost and quality of health care provided under private and federally funded programs. Should a comprehensive national health insurance program become law during the next two decades, it would not be surprising to find such a requirement attached to the reimbursement provisions.

This paper has attempted to show how licensing and certification influence the delivery of health services and why they need to be considered in planning for the future. Health educators should endeavor to stay abreast of developments by attending regulatory conferences, reading publications such as Pro Forum,[6] the NCHCA Newsletter,[7] and COPASCOPE.[8] They should also watch for the possible emergence of a regulatory clearing house at the Council of State Governments.[9]

There can be little doubt that occupational licensing and certification are forces to be reckoned with by health educators and curriculum planners. Failure to take cognizance of these institutions in planning health delivery systems for the future world would be shortsighted and a dereliction of duty.

Footnotes

1. Roederer, Doug and Shimberg, Benjamin, Occupational Licensing: Centralization of State Licensure Functions, Lexington, Ky., Council of State Governments, 1980.

2. Department of Consumer Affairs, Interim Staff Report on Career Mobility in the Dental Professions. Health Career Ladder Project, Sacramento, Ca., p. 52.

3. For additional information about the HMPP program contact Jean Ann Harlow, Chief, Health Professions Development Section, Division of Health Professions Development, Office of Statewide Health Planning and Development, 714 P Street, Sacramento, Ca. 95814, (916) 322-5566.

4. Federal Trade Commission, Bureau of Economics, Staff Report on Effects of Restrictions on Advertising and Commercial Practice in the Professions: The Case of Optometry. Washington, D.C., April 1980.

5. U.S. Department of Health, Education, and Welfare, Credentialing Health Manpower, DHEW publication No. (05) 77-50057, Public Health Service, Washington, D.C., July 1977.

6. Pro Forum is published by the National Center for the Study of Professions, 1527 New Hampshire Ave., Washington, D.C. 20036.

7. NCHCA Newsletter is published by the National Commission for Health Certifying Agencies, 1101 30th Street, N.W., Washington, D.C. 20007.

8. COPASCOPE is published by the Center for Occupational and Professional Assessment, Educational Testing Service, Princeton, N.J. 08541.

9. For informtion about the regulatory clearing house and state licensure information system, contact Doug Roederer, Council of State Governments, P.O. Box 11910, Iron Works Pike, Lexington, Ky. 40578, (606) 252-2291.

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Shimberg, Benjamin, Occupational Licensing: A Public Perspective, Educational Testing Service, Princeton, N.J., 1980.

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PERSPECTIVES ON HEALTH OCCUPATIONS EDUCATION AT THE SECONDARY LEVEL

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The stated general purpose of the Statewide Health Occupations Education Review Committee is to examine curricula in the Health Occupations--especially to examine the curricula from the futurist perspective, i.e., the degree to which the curricula are likely to prepare students for entry level positions in the Health Occupations with the skills required in the 1990's and at the turn of the century.

The specific purpose of this meeting today and tomorrow was to study the implications of regulations and credentialing on the work of the committee.

The AMA's Committee on Allied Health Education and Accreditation (CAHEA) currently accredits educational programs of some 26 different occupational titles; 46 allied health and medical specialty societies work together in this effort. Over 40,000 graduates enter the health care field each year.

Currently some 3,000 accredited programs are located in approximately 1800 educational institutions, mostly colleges or hospitals, across the nation. With very few exceptions these programs are situated at the post secondary level. Appendix G, Page 1, of the attached documentation, displays the distribution of programs. Note that approximately 150 of the 3,000 programs are located in the State of New York. Only California, Texas, Illinois, Ohio and Pennsylvania have more accredited programs than New York.

Of the 26 different types of accredited allied health programs, according to the documentation afforded to me, the Statewide Health Occupations Education Review Committee seems to have addressed itself only to three occupations which have titles identical to those accredited by CAHEA, namely Medical Assisting and Medical Laboratory Technician and Electroencephalographic Technician/Technologist.

A comparison of the very brief descriptions on Page 5 of "Health Occupations Education in New York State" and the description of the occupations in the AMA Essentials or Standards of Accreditation for Medical Assistants and Medical Laboratory Technicians would lead one to believe that these two occupations, while not exactly the same, have more similarities than differences. The EEG

Technician is only listed on Table 1 of the Preliminary Committee Recommendations of September 22, 1980. Since there is no description of the occupation I will assume we are talking about the EEG Technician/Technologist, which is currently accredited by CAHEA.[1]

Enrollment data from Figure G 4 on Page 3 of Appendix G indicates that nationally there were 141 accredited Medical Assisting programs with a 8,648 student capacity, 204 one- and two-year Medical Laboratory Technician programs with a 4,000 student capacity and 16 Electroencephalographic Technician/Technology programs with a student capacity of 180. New York State would appear, by my fast count, to have only two accredited Medical Assisting programs, six Medical Laboratory Technician programs, and two accredited Electroencephalographic Technician/Technologist programs.

The table displaying the number of accredited programs is found on Page 6 of Appendix G and the actual locations of the programs are found on Pages 8 thru 12 of Appendix G. So much for the statistics.

As I read the materials provided to me the first observation I have is that you should use the same titles as those used across the country, if, in fact, the intent is to train individuals with the same occupations. Don't, for instance, use the title medical laboratory assistant if their competencies are those of the medical laboratory technician.

I saw a diagram in the materials which seemed to advocate a sort of core curriculum and competency approach to teaching. It would apply to the above occupations and others as well in practical nursing and allied dental areas, etc.

My observation is that the schemata would probably work as I see it outlined. However, it might be well for you to touch base with others who pioneered and persevered as far as utilization of a core curriculum is concerned. During the late 1960's and early 1970's, there were many efforts at the post secondary level to utilize a core curriculum approach for allied health. Most attempts were abandoned; only a few are operational today. Touching base with those that have worked might assist in side-stepping the pitfalls that caused the demise of those attempts that failed.

I applaud you for developing programs that would teach the competencies necessary for entry level into the occupation. This, of course, is a nationwide trend and we are very far along the way in our development of lists of identified competencies and with competency based education in allied health.

It would appear the committee has accomplished a good part of its general

purpose of reviewing and formalizing an approach to curriculum for the 1990's.

Regulations and Credentialing

There is a certain lack of detail in the curriculum section and I realize that the topic for today's meeting is the effect of regulations and credentialing on the work of the committee, which to me means the effect of regulations and credentialing on the students of the programs if the proposed curricula are implemented.

I am assuming that by credentialing and regulations we are referring to accreditation of programs and certification and/or licensing of the graduates of the programs. In that regard, I would pose further questions for your consideration. Have you sought input from the professional organizations most directly concerned with the occupations under consideration? Are you aware that their accreditation standards are especially specific about the curricula for the programs? Are you aware that many of these organizations, the American Association of Medical Assistants, for example, have spent thousands of dollars in developing lists of task descriptors or competencies the entry level professional is supposed to have upon graduation from a program? Are you aware that curricula are constantly upgraded and that programs must be flexible enough to keep up with the change?

Accreditation of H.S. programs by CAHEA has been a reality for some time. I would hope the committee's program design allows for accreditation whenever possible.

Besides immediate acceptance in the health community and the status and salaries, a graduate of an accredited program usually can automtically sit for the certifying exam. This, of course, provides national mobility for the student. That mobility is also upward, by the way, since most accredited programs at an upper level will give some credit for a lower level program, provided it is an accredited program.

Constantly meeting accreditation standards would also accommodate your concerns for the future since accreditation standards constantly incorporate technological advances in the curriculum, generally even before there is total nationwide acceptance.

Appendix H is a list which I compiled for the committee which contains the credentialing agency and the credential awarded for each of the occupations accredited by CAHEA. If the committee has not contacted the representative

bodies for information on what is required for a person to sit for a certifying exam--for the above reasons I woud strongly advise that this be done.

To structure a program in which a young person would not have national mobility through national certification is, in my mind, an educational and social crime.

Licensing

Appendix I lists the Health Occupations are they are licensed in each state. This is from the DHEW booklet, "State Regulation of Health Manpower, 1977." None of the CAHEA programs required licensing of graduates in New York in 1977. I would assume that is still the case.

In summary, for justice to those graduates:

1. use titles that are accepted nationally
2. develop currriculum that meets the standards of accreditation
3. seek accreditation of your programs
4. develop a liaison with the concerned certifying bodies so that graduates can be awarded national certification

In closing, I see nothing wrong with the committee's curriculum design. That's like the hub of the wheel; but don't ignore the accreditation and certification procedures. They are like the spokes and rim that complete the wheel and they have not only already been designed, they have also been functioning very well for 50 years.

A detailed description of these programs is provided by the "Essential Program for the Medical Assistant" and other titles prepared by the AMA's Committee on Allied Health Education and Accreditation.

Appendix G: Statistical Data and Computer Listings of Accredited Programs

Introduction

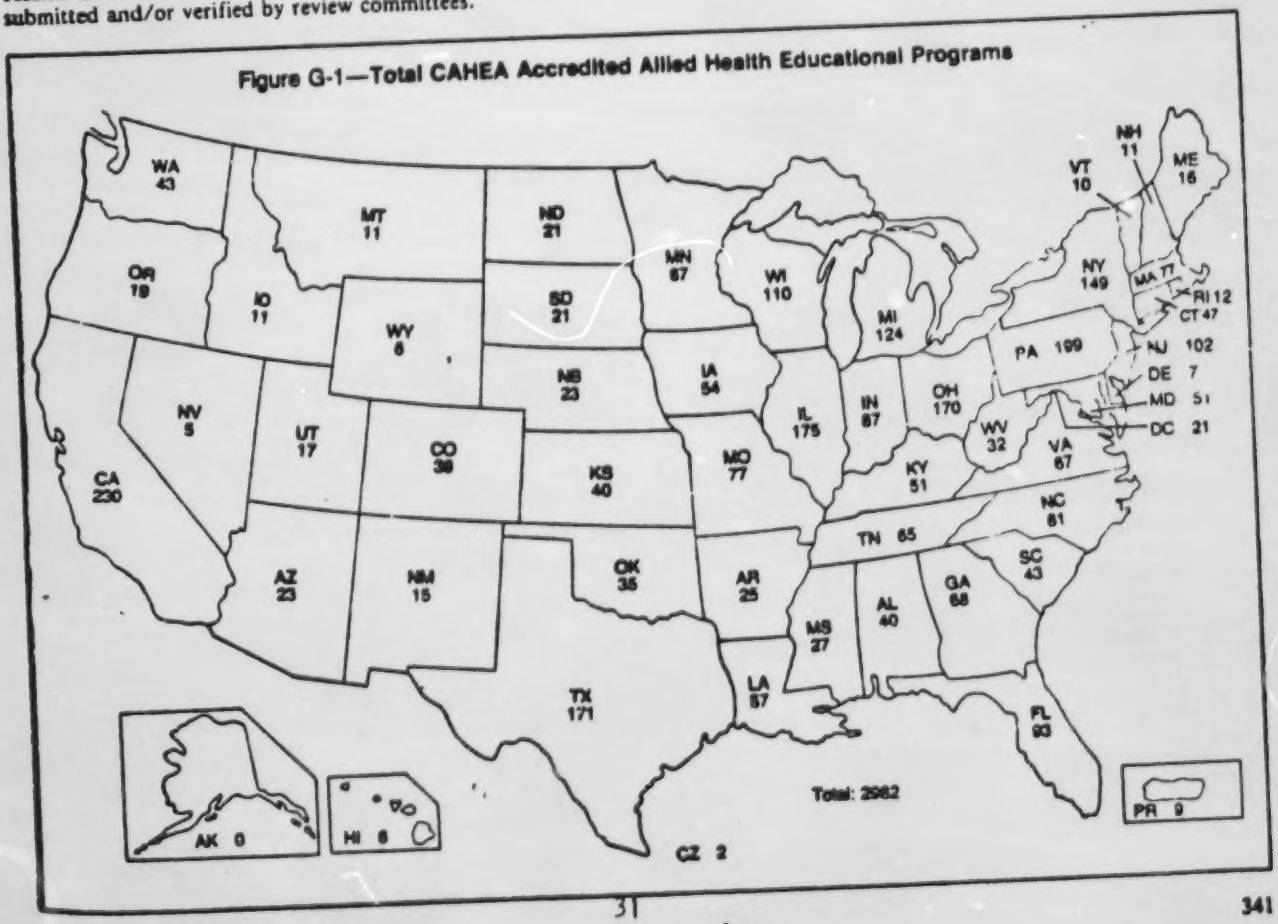
In October 1979, the Annual Report Forms were mailed to every sponsor of an allied health education program accredited by the Committee on Allied Health Education and Accreditation (CAHEA). One form, sent to the Chief Executive Officers of institutions which sponsor one or more programs accredited by CAHEA, certifies the current status of a program. The second form, sent to program directors, is used to solicit information about changes that need to be reflected in the *Directory* listings..

The information contained in the following chapters in Appendix G was obtained from the completed forms, from the program records maintained in the Department of Allied Health Education and Accreditation, and from information submitted and/or verified by review committees.

The listings and numbers of accredited program in "Accredited Educational Programs Listed by Sponsoring institution—1979," in "Accredited Educational Programs Listed by Occupational Type—1979," and in the statistical data reflect information on programs accredited through the April 1980 CAHEA meeting. Actions taken to accredit new programs or to discontinue accreditation of existing programs subsequent to April 1980 are not reflected by these lists.

The information on the number of students enrolled and graduate pertains only to the 1978-1979 academic year, as requested on the Annual Report. All other information reflects the 1980 Annual Report or subsequent updates until August 1, 1980.

Figure G-1—Total CAHEA Accredited Allied Health Educational Programs



Statistical Data

The statistical compilations in the following figures correlate with the information in the lists of accredited program. The large number of programs and of students make it impossible to maintain and report absolutely accurate current figures. Moreover, the unavoidable time lag and other variables, such as fluctuating reporting dates, differences in starting dates of classes, varied program lengths, etc., affect the consistency of annual data. Greater consistency would be particularly desirable for making comparisons from year to year. These and other variables, including differences in reporting forms and in reporting year dates, contribute to differences in statistical date released by other organizations.

In spite of the variables affecting accuracy and consistency, some general observations may be made. Between 1936 and 1942, accredited allied health educational programs increased slightly but fairly constantly. Between 1943 and 1968, the rate of increase was greater, but between 1969 and 1973, the increase and constancy were similar to those in the 1936-1942 period. After 1973, the number of accredited program increased more rapidly, reaching a total of 2,951 as of October 31, 1978. An increase of 11 programs produced a total of 2,962 as of April 1980. Annual increases and decreases in accredited program between 1936 and 1980, categorized by profession, are shown in Figure G-5.

In many cases, a decrease in the number of programs results from a change in the sponsoring institution from a health care institution to an academic institution, the health care institution that once sponsored the program now serving as a clinical affiliate. 1974 reflects such decreases; in some cases, four or more hospitals, originally sponsoring institutions, move to affiliate status with a single academic institution.

The Committee on Allied Health Education and Accreditation currently accepts eight types of institutions as sponsors of accredited programs; hospitals and clinics, junior/community colleges, colleges/universities, US government institutions, special schools, proprietary schools, and blood banks. Data included in Figures G3a and G3b reflect information received as of April 30, 1980.

Figure G-2—Sponsors of Allied Health Educational Programs

	Hospitals/Clinics	Junior/Community Coll. Voc./Technical Schools	Colleges/Universities	Medical Schools	Special Schools	Proprietary Schools	Blood Banks	US Government	Totals
1. Assistant to the Primary Care Physician	8	4	22	14	1	0	0	5	54
2. Cytotechnologist	48	0	15	5	5	0	0	1	74
3. Diagnostic Medical Sonographer	0	0	0	0	0	0	0	0	0
4. Electroencephalographic Technician	1	0	0	0	0	0	0	0	1
5. Electroencephalographic Technologist	7	6	1	0	0	0	0	1	15
6. Emergency Medical Technician—Paramedic	0	0	0	0	0	0	0	0	0
7. Histologic Technician	35	3	3	2	1	0	0	2	47
8. Medical Assistant	0	98	11	0	12	20	0	0	141
9. Medical Assistant in Pediatrics	0	0	1	0	0	0	0	0	1
10. Medical Laboratory Technician *(Associate Degree)*	0	86	17	2	1	0	0	0	105
11. Medical Laboratory Technician *(Certificate)*	47	45	2	0	3	0	0	2	99
12. Medical Record Administrator	4	0	41	5	0	0	0	1	51
13. Medical Record Technician	1	66	11	0	1	0	0	0	78
14. Medical Technologist	530	2	73	17	9	0	0	21	652
15. Nuclear Medicine Technologist	96	17	24	6	2	0	0	8	153
16. Occupational Therapist	2	0	40	8	0	0	0	0	50
17. Ophthalmic Medical Assistant	0	0	0	1	0	2	0	0	3
18. Perfusionist	0	0	0	0	0	0	0	0	0
19. Physical Therapist	11	0	36	14	0	0	0	1	62
20. Radiation Therapy Technologist	56	11	12	9	4	0	0	1	92
21. Radiographer	519	188	58	11	5	2	0	12	795
22. Respiratory Therapist	27	104	36	6	2	0	0	0	175
23. Respiratory Therapy Technician	58	89	15	0	10	1	0	2	173
24. Specialist in Blood Bank Technology	29	1	5	2	0	0	20	0	7
25. Surgeon's Assistant	0	1	2	1	0	0	0	0	4
26. Surgical Technologist (Operating Room Technician)	21	50	2	0	4	1	0	2	80
Totals	1498	789	427	103	60	26	20	59	2962

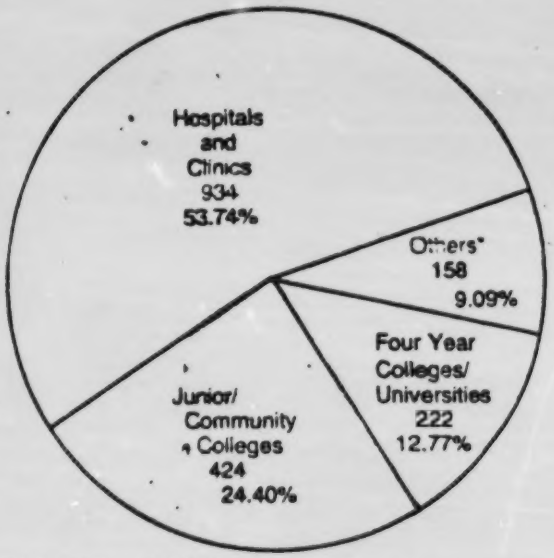
Fig G3a — Indicates the "Distribution of Institution Sponsors of Allied Health Programs."

Fig G3b — Indicates the "Distribution of Allied Health Programs According to Institutional Sponsors."

Data from the 1977-1978 academic year as compared to data from the 1978-1979 academic year indicates a slight drop in the number of students enrolled from 67,390 in the 1977-1978 period to 67,090 in the 1978-1979 period. This is in sharp contrast to the increases shown in allied health enrollements in the past. Also indicative of a plateauing is the slight drop in graduates during this same period from a high of 37,578 in the 1977-1978 period to 37,314 in the 1978-1979 period.

Fig G4 — Indicates the "Enrollment Data for each Accredited Allied Health Occupation" for the 1978-1979 academic year.

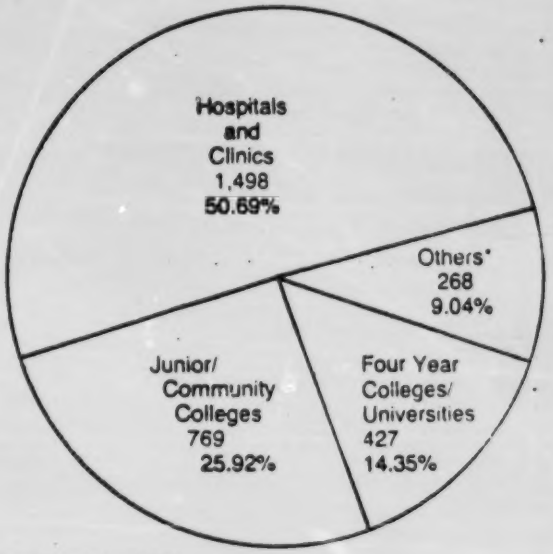
California, with 230 CAHEA-accredited allied healt educational programs, continues to have more CAHEA-accredited programs than any other state, followed by Pennsylvania with 199, Illinois with 1975, Texas with 171, Ohio with 170, and New York with 149. The number of CAHEA-accredited programs by state are given in Figure G6 and a map of total CAHEA-accredited programs appears in Figure G1.


Hospitals and Clinics 934 53.74%
Others* 158 9.09%
Four Year Colleges/ Universities 222 12.77%
Junior/ Community Colleges 424 24.40%

Total Number—1,738 Sponsors

Appendix G, Figure G3A. Distribution of Institutional Sponsors of Allied Health Programs. (1979 Data)

*Proprietary Schools, Medical Schools, US Government Institutions, Blood Banks.


Hospitals and Clinics 1,498 50.69%
Others* 268 9.04%
Junior/ Community Colleges 769 25.92%
Four Year Colleges/ Universities 427 14.35%

Total Number—2,962

Appendix G, Figure G3B. Distribution of Allied Health Programs According to Institutional Sponsors. (1979 Data)

Figure G-4—Enrollment Data for each Accredited Allied Health Occupation

Occupations	No. of Programs 4/30/80	Student Capacity 1978-1979	1978-1979 Student Data Enrollment	Graduates
1. Assistant to the Primary Care Physician	54	1,857	2,970	1,382
2. Cytotechnologist	74	480	382	320
3. Diagnostic Medical Sonographer	0	0	0	0
4. Electroencephalographic Technician	1	5	20	19
5. Electroencephalographic Technologist	15	175	137	71
6. Emergency Medical Technician-Paramedic	0	0	0	0
7. Histologic Technician	47	233	144	105
8. Medical Assistant	141	8,648	9,608	5,133
9. Medical Assistant in Pediatrics	1	25	20	8
10. Medical Laboratory Technician *(Associate Degree)*	105	2,299	3,534	1,308
11. Medical Laboratory Technician *(Certificate)*	99	1,764	1,729	1,298
12. Medical Record Administrator	51	1,175	1,350	743
13. Medical Record Technician	78	1,864	2,488	883
14. Medical Technologist	652	8,732	5,128	6,371
15. Nuclear Medicine Technologist	153	1,245	1,101	777
16. Occupational Therapist	50	2,089	2,430	1,928
17. Ophthalmic Medical Assistant	3	47	61	32
18. Perfusionist	0	0	0	0
19. Physical Therapist	82	2,251	5,767	2,303
20. Radiation Therapy Technologist	92	848	437	310
21. Radiographer	795	26,715	16,948	7,677
22. Respiratory Therapist	175	4,690	7,010	2,744
23. Respiratory Therapy Technician	173	2,826	4,032	2,708
24. Specialist in Blood Bank Technology	57	192	136	119
25. Surgeon's Assistant	4	65	97	48
26. Surgical Technologist	80	1,414	1,561	1,027
Totals	2,962	69,639	67,090	37,314

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Figure G-5—Number of CAHEA-Accredited Programs by Occupation, 1936–1978*

Reporting Year	Assistant to the Primary Care Physician (1971)†	Cytotechnologist (1962)	Diagnostic Medical Sonographer	Electroencephalographic Technician (1973)	Electroencephalographic Technologist (1973)	Emergency Medical Technician-Paramedic (1976)	Histologic Technician (1970)	Medical Assistant (1969)	Medical Assistant in Pediatrics (1972)	Medical Lab. Technician (Associate Degree) 1971	Medical Laboratory Technician (Certificate) (1967)	Medical Record Administrator (1943)	Medical Record Technician (1953)	Medical Technologist (1936)
1980	54	74	0	1	15	0	47	141	1	105	99	51	78	652
1979	54	75	0	0	13	0	40	129	1	85	96	46	74	637
1978	50	96	0	1	12	0	38	125	2	83	116	40	68	670
1977	48	100	0	1	9	0	32	113	2	64	116	39	66	667
1976	52	102	0	1	8	0	27	99	2	38	153	38	58	696
1975	49	103	0	0	3	0	27	94	2	24	167	35	52	709
1974	43	104	0	0	0	0	25	73	1	14	181	33	40	715
1973	32	108	0	0	0	0	17	52	0	5	182	30	36	737
1972	22	112	0	0	0	0	12	44	0	1	194	30	39	749
1971	0	117	0	0	0	0	0	12	0	0	212	25	29	773
1970	0	116	0	0	0	0	0	6	0	0	210	26	18	791
1969	0	118	0	0	0	0	0	0	0	0	187	27	20	787
1968	0	109	0	0	0	0	0	0	0	0	0	27	16	787
1967	0	98	0	0	0	0	0	0	0	0	0	28	12	786
1966	0	82	0	0	0	0	0	0	0	0	0	28	15	773
1965	0	84	0	0	0	0	0	0	0	0	0	29	13	781
1964	0	79	0	0	0	0	0	0	0	0	0	27	14	784
1963	0	77	0	0	0	0	0	0	0	0	0	28	14	779
1962	0	0	0	0	0	0	0	0	0	0	0	27	12	757
1961	0	0	0	0	0	0	0	0	0	0	0	28	12	734
1960	0	0	0	0	0	0	0	0	0	0	0	21	12	734
1959	0	0	0	0	0	0	0	0	0	0	0	30	12	702
1958	0	0	0	0	0	0	0	0	0	0	0	26	11	681
1957	0	0	0	0	0	0	0	0	0	0	0	30	10	656
1956	0	0	0	0	0	0	0	0	0	0	0	29	8	615
1955	0	0	0	0	0	0	0	0	0	0	0	25	7	593
1954	0	0	0	0	0	0	0	0	0	0	0	24	4	575
1953	0	0	0	0	0	0	0	0	0	0	0	23	0	538
1952	0	0	0	0	0	0	0	0	0	0	0	21	0	496
1951	0	0	0	0	0	0	0	0	0	0	0	18	9	467
1950	0	0	0	0	0	0	0	0	0	0	0	17	0	443
1949	0	0	0	0	0	0	0	0	0	0	0	13	0	383
1948	0	0	0	0	0	0	0	0	0	0	0	12	0	337
1947	0	0	0	0	0	0	0	0	0	0	0	11	0	294
1946	0	0	0	0	0	0	0	0	0	0	0	10	0	268
1945	0	0	0	0	0	0	0	0	0	0	0	10	0	256
1944	0	0	0	0	0	0	0	0	0	0	0	10	0	243
1943	0	0	0	0	0	0	0	0	0	0	0	9	0	227
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	174
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	152
1940	0	0	0	0	0	0	0	0	0	0	0	0	0	150
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	141
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	136
1937	0	0	0	0	0	0	0	0	0	0	0	0	0	110
1936	0	0	0	0	0	0	0	0	0	0	0	0	0	98

*Year that *Essentials* were originally adopted.
†Figures accurate to October 1978.

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Nuclear Medicine Technologist (1969)	Occupational Therapist (1935)	Ophthalmic Medical Assistant (1975)	Perfusionist	Physical Therapist (1936)	Radiation Therapy Technologist (1968)	Radiographer (1944)	Respiratory Therapist (1962)	Respiratory Therapy Technician (1972)	Specialist in Blood Bank Technology (1971)	Surgeon's Assistant (1974)	Surgical Technologist (Operating Room Technician) (1972)	Total
153	50	3	62	0	92	795	175	173	57	4	80	2,962
133	51	3	63	0	90	804	178	140	58	3	60	2,833
141	51	3	78	0	91	828	165	155	64	3	62	2,951
134	49	0	79	0	84	838	157	116	50	2	58	2,824
90	43	0	72	0	63	915	147	55	62	2	18	2,741
65	43	0	68	0	45	1,022	140	20	61	1	2	2,732
64	41	0	66	0	39	1,010	126	5	59	0	2	2,641
47	40	0	64	0	39	1,109	132	1	53	0	0	2,684
35	38	0	60	0	31	1,113	125	0	53	0	0	2,658
17	36	0	50	0	16	1,146	82	0	0	0	0	2,515
1	36	0	52	0	8	1,177	56	0	0	0	0	2,499
0	32	0	49	0	0	1,152	55	0	0	0	0	2,427
0	32	0	48	0	0	1,126	44	0	0	0	0	2,189
0	32	0	43	0	0	1,047	30	0	0	0	0	2,076
0	32	0	42	0	0	968	21	0	0	0	0	1,971
0	32	0	42	0	0	901	11	0	0	0	0	1,893
0	32	0	42	0	0	789	7	0	0	0	0	1,774
0	31	0	42	0	0	755	0	0	0	0	0	1,726
0	31	0	40	0	0	718	0	0	0	0	0	1,585
0	31	0	39	0	0	673	0	0	0	0	0	1,517
0	29	0	40	0	0	650	0	0	0	0	0	1,486
0	29	0	39	0	0	609	0	0	0	0	0	1,421
0	29	0	37	0	0	557	0	0	0	0	0	1,341
0	30	0	37	0	0	517	0	0	0	0	0	1,280
0	30	0	37	0	0	456	0	0	0	0	0	1,178
0	29	0	35	0	0	422	0	0	0	0	0	1,111
0	28	0	36	0	0	369	0	0	0	0	0	1,036
0	27	0	37	0	0	329	0	0	0	0	0	954
0	25	0	31	0	0	310	0	0	0	0	0	883
0	24	0	30	0	0	283	0	0	0	0	0	831
0	25	0	31	0	0	267	0	0	0	0	0	781
0	25	0	26	0	0	224	0	0	0	0	0	671
0	25	0	25	0	0	211	0	0	0	0	0	610
0	18	0	24	0	0	161	0	0	0	0	0	508
0	18	0	21	0	0	130	0	0	0	0	0	447
0	17	0	32	0	0	112	0	0	0	0	0	427
0	13	0	28	0	0	0	0	0	0	0	0	294
0	7	0	22	0	0	0	0	0	0	0	0	265
0	6	0	15	0	0	0	0	0	0	0	0	195
0	6	0	16	0	0	0	0	0	0	0	0	174
0	6	0	16	0	0	0	0	0	0	0	0	172
0	6	0	16	0	0	0	0	0	0	0	0	163
0	6	0	14	0	0	0	0	0	0	0	0	156
0	0	0	14	0	0	0	0	0	0	0	0	124
0	0	0	13	0	0	0	0	0	0	0	0	109

Figure G-6—CAHEA-Accredited Programs by State and Occupation

	Assistant to the Primary Care Physician	Cytotechnologist	Diagnostic Medical Sonographer	Electroencephalographic Technician	Electroencephalographic Technologist	Emergency Medical Technician-Paramedic	Histologic Technician	Medical Assistant	Medical Assistant in Pediatrics	Medical Laboratory Technician (Associate Degree)	Medical Laboratory Technician (Certificate)	Medical Record Administrator	Medical Record Technician
Alabama	0	2	0	0	1	0	0	1	0	3	0	1	2
Alaska	0	0	0	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	1	0	0	0	0	1	0	0	1
Arkansas	0	0	0	0	0	0	0	0	0	0	1	0	0
California	6	5	0	0	1	0	1	3	0	1	0	1	0
Canal Zone	0	0	0	0	0	0	3	0	0	0	1	3	6
Colorado	1	1	0	0	0	0	0	3	0	1	0	1	1
Connecticut	1	1	0	0	0	0	0	1	0	1	0	0	0
Delaware	0	0	0	0	0	0	0	0	0	0	0	0	0
Dist. Columbia	2	0	0	0	0	0	0	0	0	0	0	0	0
Florida	1	1	0	0	3	0	1	4	0	4	4	2	1
Georgia	2	1	0	0	0	0	0	1	0	3	6	2	0
Hawaii	0	0	0	0	0	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0	0	0
Illinois	0	3	0	0	0	0	1	4	0	4	4	2	1
Indiana	0	3	0	0	0	0	0	1	0	2	6	1	0
Iowa	1	1	0	0	0	0	0	0	0	2	0	0	0
Kansas	1	3	0	0	0	0	0	0	0	1	2	0	1
Kentucky	1	1	0	0	0	0	0	0	0	0	1	0	0
Louisiana	0	1	0	0	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0	0	0	0	0
Maryland	1	2	0	0	0	0	0	0	0	0	0	0	0
Massachussetts	1	2	0	0	0	0	0	0	0	0	0	0	0
Michigan	2	3	0	0	0	0	0	0	0	0	0	0	0
Minnesota	0	1	0	0	0	0	0	0	0	0	0	0	0
Mississippi	0	1	0	0	0	0	0	0	0	0	0	0	0
Missouri	1	1	0	0	0	0	0	0	0	0	0	0	0
Montana	0	0	0	0	0	0	0	0	0	0	0	0	0
Nebraska	1	0	0	0	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0	0	0	0
New Jersey	1	2	0	0	0	0	0	0	0	0	0	0	0
New Mexico	1	0	0	0	0	0	0	0	0	0	0	0	0
New York	6	4	0	1	1	0	0	0	0	0	0	0	0
North Carolina	3	3	0	0	1	0	0	0	0	0	0	0	0
North Dakota	1	1	0	0	0	0	0	0	0	0	0	0	0
Ohio	3	6	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	1	1	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	1	0	0	0	0	0	0	0	0	0	0	0
Pennsylvania	5	4	0	0	1	0	0	0	0	0	0	0	0
Puerto Rico	0	1	0	0	0	0	0	0	0	0	0	0	0
Rhode Island	0	1	0	0	0	0	0	0	0	0	0	0	0
South Carolina	1	0	0	0	0	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0
Tennessee	1	2	0	0	0	0	0	0	0	0	0	0	0
Texas	4	6	0	0	2	0	0	0	0	0	0	0	0
Utah	1	0	0	0	0	0	0	0	0	0	0	0	0
Vermont	0	1	0	0	0	0	0	0	0	0	0	0	0
Virginia	1	2	0	0	0	0	0	0	0	0	0	0	0
Washington	1	1	0	0	0	0	0	0	0	0	0	0	0
West Virginia	1	2	0	0	0	0	0	0	0	0	0	0	0
Wisconsin	1	3	0	0	1	0	0	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**84**	**74**	**0**	**1**	**18**	**0**	**47**	**141**	**1**	**105**	**99**	**51**	**78**

Medical Technologist	Nuclear Medicine Technologist	Occupational Therapist	Ophthalmic Medical Assistant	Perfusionist	Physical Therapist	Radiation Therapy Technologist	Radiographer	Respiratory Therapist	Respiratory Therapy Technician	Specialist in Blood Bank Technology	Surgeon's Assistant	Surgical Technologist (Operating Room Technician)	Total
12	1	1	0	0	1	0	11	2	1	0	1	0	40
0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	1	0	0	0	0	1	3	4	5	0	0	1	23
7	1	1	0	0	1	1	6	1	2	0	0	2	25
51	14	2	0	0	5	15	42	21	14	8	0	4	230
1	0	0	0	0	0	0	1	0	0	0	0	0	2
10	3	1	0	0	1	1	8	2	3	0	0	1	38
9	3	1	0	0	2	1	17	5	2	0	0	2	47
2	1	0	0	0	0	0	2	1	0	0	0	0	7
6	2	1	0	0	1	2	4	1	0	2	0	0	21
16	4	2	0	0	1	1	27	7	10	1	0	3	83
10	2	1	0	0	3	3	18	3	5	1	0	2	68
4	0	0	0	0	0	0	1	0	0	0	0	0	6
4	0	0	0	0	0	1	2	1	1	0	0	1	11
41	6	1	0	0	2	6	49	10	14	4	0	7	175
17	5	1	0	0	1	1	21	4	5	0	0	6	87
13	1	0	1	0	1	1	17	2	1	0	0	4	54
6	3	1	1	0	2	1	11	2	1	2	0	2	40
9	2	1	2	0	1	1	15	2	4	2	0	1	51
28	3	2	0	0	1	0	12	4	5	5	0	1	57
3	0	0	0	0	0	0	7	0	2	0	0	1	16
9	3	1	2	0	1	1	17	2	2	2	0	0	51
22	4	2	2	0	0	2	15	6	3	0	0	1	77
34	8	2	2	0	2	3	34	8	5	4	0	3	124
12	4	1	1	0	2	1	15	4	2	1	0	0	57
5	1	0	0	0	1	0	6	1	5	0	0	1	27
17	7	2	0	0	3	4	20	5	3	4	0	2	77
4	0	0	0	0	0	0	4	0	1	0	0	1	11
5	1	0	0	0	0	1	8	2	1	0	0	1	23
1	1	0	0	0	0	0	2	0	1	0	0	0	5
1	0	1	0	0	0	0	4	0	0	0	0	0	11
22	11	1	0	0	0	3	32	5	8	0	0	1	102
2	1	0	0	0	1	0	6	1	2	0	0	0	15
25	9	6	1	0	6	5	48	10	5	1	0	3	149
13	5	1	1	0	3	1	29	3	1	2	0	3	81
5	1	1	2	0	1	0	8	1	1	0	0	0	21
42	7	2	1	0	1	3	52	9	10	2	0	1	170
13	2	1	0	0	0	2	6	3	0	0	0	0	35
3	1	0	0	0	0	1	3	2	1	0	0	1	19
38	11	3	1	0	2	5	71	7	12	2	0	2	199
2	1	1	0	0	1	0	0	1	0	0	0	0	9
6	1	1	0	0	0	1	1	1	1	0	0	0	12
8	2	2	1	0	1	1	11	3	2	0	0	0	43
8	0	1	0	0	0	0	6	2	2	0	0	0	21
12	3	0	0	0	1	4	15	5	3	4	0	1	85
38	4	1	0	0	4	6	37	12	14	6	0	8	171
4	1	1	0	0	1	2	4	1	0	1	0	0	17
1	1	1	0	0	1	1	2	0	0	0	0	0	10
10	2	1	1	0	1	4	17	3	7	2	0	2	67
10	3	2	0	0	1	1	5	2	3	0	0	1	43
6	2	0	0	0	1	1	11	1	0	0	0	1	32
33	4	3	0	0	3	3	28	3	4	1	0	4	110
1	0	0	0	0	0	0	4	0	1	0	0	0	6
652	153	50	3	0	62	92	37795	175	173	57	4	80	2982

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Niagara Falls Memorial Medical Center
Don A. Corey, President
621 Tenth St.
Niagara Falls, New York 14302
(716) 278-4301
RADIOGRAPHER

NORTHPORT
Northport Veterans Administration Hospital
W. L. Hodson, Medical Center Director
Middleville Rd.
Northport, New York 11768
(516) 261-4400
NUCLEAR MEDICINE TECHNOLOGIST
RADIOGRAPHER

OCEANSIDE
South Nassau Communities Hospital
Michael Rodzenko, Exec. Dir.
3445 Oceanside Rd.
Oceanside, New York 11572
(516) 764-2600
RADIOGRAPHER

PLATTSBURGH
Champlain Valley Physicians Hospital Medical Center
David T. Hannan, President
100 Beekman St.
Plattsburgh, New York 12901
(518) 561-2000
MEDICAL LABORATORY TECHNICIAN (CERT PROGRAM)
RADIOGRAPHER

PORT CHESTER
United Hospital
Kenneth F. Adamec, President
406 Boston Post Rd.
Port Chester, New York 10573
(914) 939-7000
RADIOGRAPHER
ELECTROENCEPHALOGRAPHIC TECHNICIAN

POUGHKEEPSIE
Dutchess Community College
John J. Connolly, President
Pendell Rd.
Poughkeepsie, New York 12601
(914) 471-4500
MEDICAL ASSISTANT

RIVERDALE
Manhattan College
Br. Patrick S. McGarry, Exec V.P.
Department of Radiological and Health Sciences
Manhattan College Pkwy.
Riverdale New York 10471
(212) 548-1400
NUCLEAR MEDICINE TECHNOLOGIST
RADIATION THERAPY TECHNOLOGIST

RIVERHEAD
Central Suffolk Hospital
Robert F. Ecroyd, Exec., Vice President
1300 Roanoke Ave.
Riverhead, New York 11901
(516) 369-6066
RADIOGRAPHER

ROCHESTER
Genesee Hospital
Paul W. Hanson, President
224 Alexander St.
Rochester, New York 14607
(716) 263-6000
RADIOGRAPHER

Monroe Community College
Dr. Moses S. Koch, President
1000 E. Henrietta Rd.
Rochester, New York 14623
(716) 442-9950
MEDICAL RECORD TECHNICIAN
RADIOGRAPHER

Rochester General Hospital
Arthur E. Liebert, President
1425 Portland Ave.
Rochester, New York 14621
(716) 338-3220
MEDICAL TECHNOLOGIST

Rochester Institute of Technology
Dr. Paul Miller, President
One Lomb Memorial Dr.
Rochester, N.Y. 14623
(716) 475-2394
MEDICAL RECORD TECHNICIAN
NUCLEAR MEDICINE TECHNOLOGIST

Rochester St. Mary's Hospital of the Sisters of Charity
Sr. Ann William, Executive Director
89 Genesee St.
Rochester, New York 14611
(716) 328-3300
MEDICAL TECHNOLOGIST

ROCKVILLE CENTRE
Mercy Hospital
R. C. Herrmann, Admin.
1000 N. Village Ave.
Rockville Center, New York 11570
(516) 255-2200
RADIOGRAPHER

SARANAC LAKE
North Country Community College
Peter J. Cayan, President
20 Winona Ave.
Saranac Lake, New York 12983
(518) 819-2915
RADIOGRAPHER

SCHENECTADY
Ellis Hospital
William Madden, Admin. Director
1101 Nott St.
Schenectady, New York 12308
(518) 382-4144
MEDICAL TECHNOLOGIST

STATEN ISLAND
The College of Staten Island-Cuny
Dr. Edmond Volpe, President
715 Ocean Terrace
Staten Island, New York 10301
(212) 930-7940
MEDICAL LABORATORY TECHNICIAN (ASSOC DEGREE)

U.S. Public Health Service
Florence Kavaler, MD, MPH, Director
Bay st. & Vanderbilt Ave.
Staten Island, New York 10304
(212) 447-3010
MEDICAL TECHNOLOGIST
RADIOGRAPHER
ASSISTANT TO THE PRIMARY CARE PHYSICIAN

STONY BROOK
State U of NY at Stony Brook
T. Alexander Pond, Actg. President
Stony Brook, New York 11794
(516) 246-5940
RESPIRATORY THERAPIST
MEDICAL TECHNOLOGIST
ASSISTANT TO THE PRIMARY CARE PHYSICIAN

SUFFERN
Rockland Community College
Dr. Seymour Eskow, President
145 College Rd.
Suffern, New York 10901
(914) 356-4650
MEDICAL LABORATORY TECHNICIAN (ASSOC DEGREE)

SYRACUSE
Onondaga Community College
Dr. Andreas A. Paloumpis, President
Syracuse, New York 13215
(315) 469-7652
RESPIRATORY THERAPIST
RESPIRATORY THERAPY TECHNICIAN

State University of New York-Upstate Medical Center
Richard P. Schmidt, MD, President
766 Irving Ave.
Syracuse, New York 13210
(315) 473-4513
CYTOTECHNOLOGIST
RESPIRATORY THERAPIST
MEDICAL TECHNOLOGIST
RADIATION THERAPY TECHNOLOGIST
RADIOGRAPHER
SPECIALIST IN BLOOD BANK TECHNOLOGY

TROY
Hudson Valley Community College
James J. Fitzgibbons, President
80 Vandenburgh Ave.
Troy, New York 12180
(518) 283-1100
RESPIRATORY THERAPIST
RADIOGRAPHER

APPENDIX II

Allied Health Occupation	Credentials	Credentialing Agency
Assistant to the Primary Care Physician	PAC - Physician's Assistant-Certified	National Commission on Certification for Physician's Assistants 3384 Peachtree Rd., Suite 560 Atlanta, Georgia 30326
Cytotechnologist	CT (ASCP) - Cytotechnologist	American Board of Cardiovascular Perfusion 3500 Hardy St., No. 23 Hattiesburg, Mississippi
3. Diagnostic Medical Sonographer	RDMS - Registered Diagnostic Medical Sonographer	American Registry of Diagnostic Medical Sonographers Division of Cardiology Cincinnati Children's Hospital Elland and Bethesda Cincinnati, Ohio 45229
4. Electroencephalographic Technician	CMET - Certified Medical Electroencephalographic Technician	American Board of Electroencephalography Secretary-Technologist Division American Medical Electroencephalographic Ass 825 Nicollet on the Mall Minneapolis, Minnesota 55402
5. Electroencephalographic Technologist	CMET - Certified Medical Electroencephalographic Technologist	American Board of Registration of Electroencephalographic Technologists Secretary-Treasurer Atlanta Neurological Clinic 3312 Piedmont Road NE Atlanta, Georgia 30305
6. Emergency Medical Technician - Paramedic	EMT-Paramedic - Emergency Medical Technician-Paramedic	National Registry of Emergency Medical Technicians 1395 E. Dublin-Granville Road P. O. Box 29233 Columbus, Ohio 43229

Allied Health Occupation	Credentials	Credentialing Agency
7. Histologic Technician	HT(ASCP) - Histologic Technician	Board of Registry American Society of Clinical Pathologi P. O. Box 4872 Chicago, Illinois 60680
8. Medical Assistant	CMA - Certified Medical Asst.	American Association of Medical Assista One East Wacker Drive, Suite 2110 Chicago, Illinois 60601
9. Medical Assistant in Pediatrics	CMA-P - Certified Medical Assistant-Pediatrics	American Association of Medical Assista One East Wacker Drive, Suite 2110 Chicago, Illinois 60601
10. Medical Laboratory Technician (Associate Degree)	MLT(ASCP) - Medical Laboratory Technician	Board of Registry American Society of Clinical Pathologis P. O. Box 4872 Chicago, Illinois 60680
11. Medical Laboratory Technician (Certificate)	CLA(ASCP) Certified Laboratory Assistant	Board of Registry American Society of Clinical Pathologis P. O. Box 4872 Chicago, Illinois 60680
12. Medical Record Administrator	RRA - Registered Record Administrator	American Medical Record Association 875 N. Michigan Ave., Suite 1850 Chicago, Illinois 60611
13. Medical Record Technician	ART - Accredited Record Technician	American Medical Record Association 875 N. Michigan Ave., Suite 1850 Chicago, Illinois 60611
14. Medical Technologist	MT(ASCP) - Medical Technologist	Board of Registry American Society of Clinical Pathologist P. O. Box 4862 Chicago, Illinois 60680

Allied Health Occupation	Credentials	Credentialing Agency
15. Nuclear Medicine Technologist	CNMT - Certified Nuclear Medicine Technologist or	Nuclear Medicine Technology Certification Board 475 Park Avenue South-15th Floor New York, NY 10016
	NM(ASCP) - Nuclear Medicine Technologist or	Board of Registry American Society of Clinical Patholog P. O. Box 4872 Chicago, Illinois 60680
	RT (N) (ARRT) - Registered Nuclear Medicine Technologist	American Registry of Rediologic Technologists 2600 Wayzata Blvd. Minneapolis, Minnesota 55405
16. Occupational Therapist	OTR - Occupational Therapist Registered	American Occupational Therapy Assn. 6000 Executive Blvd., Suite 200 Rockville, Maryland 20852
17. Ophthalmic Medical Assistant	COT - Certified Ophthalmic Technician	Joint Commission on Allied Health Personnel in Ophthalmology 1575 University Ave. St. Paul, Minnesota 55104
18. Perfusionist	CCP - Cardiovascular Clinical Perfusionist	American Board of Cardiovascular Perfusion 3500 Hardy St., No. 23 Hattiesburg, Mississippi
19. Physical Therapist	RPT - Registered Physical Therapist or LPT - Licensed Physical Therapist	Interstate Reporting Service Professional Examination Service 475 Riverside Dr New York, New York 10027
20. Radiation Therapy Technologist	RT(T)(ARRT) - Registered Radiation Therapy Technologist	American Registry of Radiologic Technologists 2600 Wayzata Blvd. Minneapolis, Minnesota 55405

	Allied Health Occupation	Credentials	Credentialing Agency
21.	Radiographer	(RT(R)(ARRT) - Registered Radiographer	American Registry of Radiologic Technologis 2600 Wayzata Blvd. Minneapolis, Minnesota 55405
22.	Respiratory Therapist	RRT - Registered Respiratory Therapist	National Board for Respiratory Therapy 1900 W. 47th Place, Suite 124 Shawnee Mission, Kansas 66205
23.	Respiratory Therapy Technician	CRTT- Certified Respiratory Therapy Technician	National Board for Respiratory Therapy 1900 W. 47th Place, Suite 124 Shawnee Mission, Kansas 66205
24.	Specialist in Blood Bank Technology	SBB(ASCP) - Specialist in Blood Banking	Board of Registry American Society of Clinical Pathologists P. O. Box 4872 Chicago, Illinois 60680
25.	Surgeon's Assistant	PAC - Physician's Assistant-Certified	National Commission on Certification for Physician's Assistants 3384 Peachtree Rd., Suite 560 Atlanta, Goergia 30326
26.	Surgical Technologist	CST - Certified Surgical Technologist	Association of Surgical Technologists 1100 W. Littleton Blvd., Suite 101 Littleton, Colorado 80120

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DHEW - STATE REGULATION OF HEALTH MANPOWER - 1977

TABLE A - HEALTH OCCUPATIONS LICENSED IN EACH STATE

APPENDIX I

STATE	Acupuncturist	Health Dept. Administrator	Hospital Administrator	Nursing Home Administrator	Chiropractor	Clinical Lab Director	Clinical Lab Technician	Dentist	Dental Hygienist	Emergency Medical Personnel	Inhalation Therapists	Midwife	Practical Nurses	Professional Nurses	Occupational Therapist	Optician	Optometrist	Pharmacist	Physical Therapist	Physical Therapist Assistant	Physician (M.D.)	Physician (D.O.)	Physician's Assistant	Podiatrist	Psychologists	Radiology Technician	Sanitarian	Social Worker	Speech Pathologist/ Audiologist	Veterinarian	Animal Health Technician	
Alabama				X	X			X	X			X	X	X			X	X	X	X	X	X	X	X	X		X			X		18
Alaska				X	X			X	X				X	X		X	X	X	X		X	X		X	X					X		14
Arizona				X	X			X	X			X	X	X		X	X	X	X	X	X	X		X	X					X		17
Arkansas				X	X			X	X	X	X		X	X			X	X	X		X	X		X	X		X	X	X	X	X	20
California	X			X	X		X	X	X	X			X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	25
Colorado				X	X			X	X			X	X	X			X	X	X		X	X	X	X	X		X	X		X		18
Connecticut				X	X	X		X	X			X	X	X		X	X	X	X		X	X		X	X		X		X	X		19
Delaware				X	X			X	X	X			X	X			X	X	X		X	X		X	X				X	X		16
Florida				X	X		X	X	X			X	X	X	X	X	X	X	X	X	X	X		X	X		X		X	X		21
Georgia				X	X	X		X	X			X	X	X		X	X	X	X	X	X	X	X	X	X		X		X	X		21
Hawaii	X			X	X		X	X	X			X	X	X		X	X	X	X		X	X		X	X	X	X		X	X		21
Idaho				X	X			X	X				X	X			X	X	X		X	X		X	X		X			X		15
Illinois				X	X	X		X	X			X	X	X			X	X	X		X	X	X	X	X		X	X		X	X	20
Indiana				X	X			X	X	X		X	X	X			X	X	X	X	X	X	X	X	X		X		X	X	X	20
Iowa				X	X			X	X				X	X			X	X	X		X	X	X	X	X					X		15
Kansas				X	X		X	X	X				X	X			X	X	X	X	X	X	X	X	X			X		X	X	19
Kentucky				X	X			X	X				X	X		X	X	X	X	X	X	X		X	X		X	X	X	X		19
Louisiana				X	X			X	X			X	X	X			X	X	X		X	X		X	X		X	X	X	X		18
Maine				X	X			X	X				X	X			X	X	X		X	X		X	X			X		X	X	16
Maryland				X	X			X	X			X	X	X			X	X	X	X	X	X		X	X		X	X	X	X		19
Massachusetts				X	X			X	X				X	X		X	X	X	X		X	X		X	X		X			X		16
Michigan				X	X			X	X				X	X			X	X	X		X	X	X	X	X		X			X		16
Minnesota			X	X	X			X	X			X	X	X			X	X	X		X	X		X	X					X		16
Mississippi				X	X			X	X				X	X			X	X	X		X	X		X	X		X		X	X		16
Missouri				X	X			X	X				X	X			X	X	X		X	X		X					X	X		14
Montana	X			X	X			X	X				X	X			X	X	X		X	X		X	X	X	X		X	X	X	19
Nebraska				X	X			X	X				X	X			X	X	X		X	X		X	X		X			X		15
Nevada	X			X	X			X	X				X	X		X	X	X	X	X	X	X	X	X		X			X		19
New Hampshire				X	X			X	X				X	X			X	X	X		X	X		X	X					X		14
New Jersey		X		X	X	X		X	X			X	X	X		X	X	X	X	X	X	X		X	X	X	X			X		21
New Mexico				X	X			X	X	X			X	X			X	X	X		X	X	X	X	X					X	X	17
New York	X			X	X			X	X	X			X	X	X	X	X	X	X		X	X		X	X	X		X	X	X		21
North Carolina				X	X			X	X				X	X		X	X	X	X	X	X	X		X	X		X		X	X		18

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TABLE A–HEALTH OCCUPATIONS LICENSED IN EACH STATE–Continued

APPENDIX I

STATE	Acupuncturist	Health Dept. Administrator	Hospital Administrator	Nursing Home Administrator	Chiropractor	Clinical Lab Director	Clinical Lab Technician	Dentist	Dental Hygienist	Emergency Medical Personnel	Inhalation Therapists	Midwife	Practical Nurses	Professional Nurses	Occupational Therapist	Optician	Optometrist	Pharmacist	Physical Therapist	Physical Therapist Assistant	Physician (M.D.)	Physician (D.O.)	Physician's Assistant	Podiatrist	Psychologists	Radiology Technician	Sanitarian	Social Worker	Speech Pathologist/ Audiologist	Veterinarian	Animal Health Technician	
North Dakota				X	X			X	X				X	X			X	X	X		X	X		X	X				X	X	X	16
Ohio				X	X			X	X				X	X			X	X	X		X	X		X	X		X	X	X	X		16
Oklahoma				X	X			X	X				X	X			X	X	X	X	X	X		X	X		X		X	X		18
Oregon				X	X			X	X	X			X	X			X	X	X	X	X	X	X	X	X		X		X	X	X	20
Pennsylvania				X	X			X	X			X	X	X			X	X	X		X	X		X	X				X			15
Rhode Island				X	X			X	X			X	X	X		X	X	X	X		X	X		X	X		X		X	X		18
South Carolina				X	X	X		X	X				X	X		X	X	X	X	X	X	X		X	X		X		X	X		19
South Dakota				X	X			X	X				X	X			X	X	X		X	X		X	X		X	X	X	X		16
Tennessee				X	X	X	X	X	X	X			X	X		X	X	X	X		X	X		X	X		X		X	X	X	21
Texas				X	X			X	X				X	X			X	X	X	X	X	X		X	X		X		X			16
Utah				X	X			X	X				X	X			X	X	X		X	X		X	X	X	X	X	X	X		17
Vermont				X	X			X	X				X	X			X	X	X		X	X		X	X		X		X			16
Virginia				X	X			X	X			X	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	22
Washington				X	X			X	X			X	X	X		X	X	X	X	X	X	X		X	X		X		X	X		18
West Virginia				X	X			X	X				X	X			X	X	X		X	X		X	X		X		X			16
Wisconsin				X	X			X	X	X			X	X			X	X	X		X	X	X	X	X		X		X			17
Wyoming				X	X			X	X			X	X	X			X	X	X		X	X		X	X				X	X		16
District of Columbia				X	X			X	X			X	X	X			X	X	X		X	X		X	X							15
TOTAL	5	1	1	51	51	6	5	51	51	10	1	19	51	51	2	19	51	51	51	18	51	51	14	51	48	6	34	14	26	51	14	905

PLANNING FOR DENTAL AUXILIARY EDUCATION AS INFLUENCED BY LICENSURE AND ACCREDITATION

Robert H. Dougherty
American Dental Association

The title of this paper reflects the concern of the Statewide Health Occupations Education Review Committee that licensure and accreditation have implication for the education of those who would be health practitioners. The scope of this paper will be limited to the licensure and accreditation of the three dental auxiliary disciplines, dental hygiene, dental assisting and dental laboratory technology. An attempt will be made to specify some of these implications for education while describing what is presently the case in the licensure and accreditation of these three disciplines, as well as what may be the case given certain developments.

Licensure and Dental Hygiene

All of the licensing jurisdictions in the United States license dental hygienists. Graduates of United States dental hygiene programs accredited by the Commission on Dental Accreditation are eligible for dental hygiene licensure in all jurisdictions. Only Alabama does not require graduation from a program accredited by the Commission on Dental Accreditation. The arrangements for dental hygiene licensure examinations vary among the states. All U.S. jurisdictions except Alabama and Delaware accept satisfactory scores on the dental hygiene examination of the Joint Commission on National Dental Examinations (formerly the National Board Dental Examinations) as fulfilling or partially fulfilling the state written examination for licensure. Dental hygiene candidates who have taken the examination of the Joint Commission are required to take additional written tests in all jurisdictions excpet California, Illinois, Iowa, Massachusetts, New Jersey, New York, Puerto Rico, Rhode Island and Utah. These written tests vary among the jurisdictions.

Alabama and Delaware accept only satisfactory scores on their respective state written examinations as fulfilling or partially fulfilling their written examination requirements for licensure. Jurisdictions which offer their own written examination in addition to accepting National Board results are Arizona, Arkansas, Colorado, Connecticut, District of Columbia, Hawaii, Idaho, Indiana,

Mississippi, Missouri, Nebraska, Oklahoma, Oregon, Puerto Rico, Virginia, and Washington.

Besides the written portion of the dental hygiene licensure requirements, a clinical examination must also be taken. Four regional clinical testing services conduct the clinical examination for the majority of the states. Appendix I lists the regional testing services, the states they serve, and the time limits for accepting regional testing service results.

A state performance examination is available for dental hygiene candidates who have not passed the regional dental hygiene examination in the following jurisdictions: Arizona, Connecticut, District of Columbia, Illinois, Maryland, Massachusetts, Nebraska, New York, South Dakota and Tennessee. In Missouri, this examination is available only for dental hygiene candidates who have been licensed and practicing in another jurisdiction for two years.

This is a quick, simplified version of licensure provisions for dental hygienists, focusing on elements which are common to a large number of states. Individual practice acts and licensing procedures vary a great deal from state to state. Summarizing what is written above:

1. All but one licensing jurisdiction requires graduation from a dental hygiene program accredited by the Commission on Dental Accreditation.
2. Almost all licensing jurisdictions accept as fulfilling or partially fulfilling the written examination requirement offered by the Joint Commission on National Dental Examinations.
3. All licensing jurisdictions require a clinical examination.

Licensure in the profession is obviously of keen interest to the graduates of dental hygiene programs. Likewise, the success of one's students on the licensure examination is of paramount importance to program faculty. The areas tested by the licensing examinations are therefore of great interest to those responsible for dental hygiene education. Appendix II contains the outline for the Dental Hygiene Examination administered by the Joint Commission on National Dental Examinations.

Also of importance to educators is the manner in which examination items are constructed. The dental hygiene examination of the Joint Commission on Dental Examinations is constructed by teams of consultants. Vacancies on test construction committees occur regularly, because consultants serve a maximum of five consecutive one-year terms. When there is an opening, nominations for a replacement are sought. All dental hygiene program directors and all secretaries

of state boards of dentistry are contacted for nominations to fill vacancies on dental hygiene test construction committees. Minimum qualifications for test constructors have been established. A pool of nominees is needed to insure that those selected are highly qualified and geographically distributed.

Test construction consultants are selected who are qualified in each of the following areas: periodontics, basic sciences, radiography, dental hygiene curriculum, clinical hygiene, and community dental health. Interdisciplinary committees meet three times a year for three days to review unsatisfactory test items, to review the draft examination and to prepare a draft examination. An objective of the Joint Commission is to keep the examination current with what is taught in a majority of the states. The Joint Commission believes that it would be unfair to include in the test those functions which would be legal in only a few states. The constructors of the Joint Commission's dental hygiene examination follow the lead of the states and in so doing provide for potential mobility of hygienists from one state to another.

The outline of the dental hygiene examination (Appendix II) is evaluated annually to keep it current with what is being taught. This outline is routinely sent to program directors and periodically the directors are asked to critique it for relevance and balance. Changes in the outline are made from year to year and communicated back to program directors. This follower role as exercised by the Joint Commission should alleviate some concern that the future has already been decided in dental hygiene, thus voiding any task this committee has set out to accomplish. Insofar as this follower role is also observed by the regional testing bodies that review the clinical competency of graduates the task of planning the future of dental hygiene education would not be impeded by at least the examination requirements for licensure.

That aspect of state practice acts that determines which functions are delegatable to dental hygienists might be more restrictive of the work of this committee. Appendix III presents the "Percentage of Responding Jurisdictions that Allow Expanded Functions in Dental Assisting and Dental Hygiene." Reading the trend lines from 1975 to 1980, there has been an increase in almost every instance in the percentage of jurisdictions that allow these expanded functions. The percentage varies from high to low depending on the function listed. One might conclude from this evidence that practice acts will continue the trend to delegate more and more of these functions. Other factors could very well influence these trends in the future.

It is interesting to note that in 1972 it was reported that dental hygienists had no representation on boards which regulate them (Shimberg, et al., p.22, 1972). A 1979 survey conducted by the Wisconsin Dental Association with fifty states reporting, indicates that 28% of the state boards have dental hygienist members with full voting powers. The trend to greater participation of dental hygienists and the public is apparent in Appendix IV.

Licensure and Dental Assisting

At present, dental assistants are not licensed as such by any state. The American Dental Association has a policy against the licensing of any dental auxiliary other than the dental hygienist. The reasons for this ADA policy are explained below.

Through the years in supporting formal education, the American Dental Association has at the same time continuously reiterated its support for the licensing process, providing that the process remains with each state's licensing system. Traditionally, two members of the dental care delivery system have been licensed, the dentist and the dental hygienist. Concurrently, the ADA has voiced strong opposition either to federal licensure or to federal intervention into the state licensing system.

In supporting state licensure for dentists and dental hygienists to ensure that only qualified individuals provide care to the public, the profession was not convinced in the past that there was a need to license the dental assistant. It has been the profession's contention that the criterion which should determine the need to license any category of personnel should be based upon the total responsibility of that category of auxiliary in the dental care delivery system and on how that auxiliary functions in the delivery system. The profession has been steadfast in believing that it is inappropriate to license an individual to perform specific tasks or individual functions, such as making radiographic exposures. Further, the need to license dental assistants has not been viewed as being essential since they function under the direction and supervision of the dentist in the delivery system and since the dentist assumes total responsibilities for patient care.

The ADA, in 1971, established a moratorium on the licensure, registration or certification of additional kinds of dental auxiliaries until more definitive information was available about the relative role of the dentist and expanded function dental auxiliaries. As noted previously, in 1971 the dentist and dental

hygienists were already being licensed while a voluntary certification process was available to the traditional chair-side dental assistant who completed a dental assisting educational program accredited by the Commission on Dental Accreditation.

The American Dental Association's position was influenced, in large measure, by the results of federally sponsored studies on licensure. Specifically, the June 1971 Department of Health, Education, and Welfare's Report on Licensure and Related Health Personnel Credentialing recommended that, "All states are urged to observe a two-year moratorium on the enactment of legislation that would establish new categories of health personnel with statutorily-defined scopes of function." The rationale provided was that it would be unwise to develop new statutes that define functions narrowly and establish rigid requirements for education and training at a time when education of health professionals was undergoing rapid change, when the organization of health care was being modified and when the functions of health workers in the various service settings were being revised and broadened. In the 1973 follow-up report, Developments in Health Manpower Licensure, the moratorium recommendation was subsequently extended for an additional two-year period. In June 1976, A Proposal for Credentialing Health Manpower was prepared by the Subcommittee on Health Related Manpower Coordinating Committee. Recommendation IV in that document suggests that:

> States should entertain proposals to licensure additional categories of health personnel with caution and deliberation. Before enacting any legislation that would license additional categories of health manpower, states should consider the following factors:
>
> 1. In what way will the unregulated practice clearly endanger the health, safety and welfare of the public, and is the potential for harm easily recognizable and not remote or dependent on tenuous argument?
>
> 2. How will the public benefit by an assurance of initial and continuing professional competence?
>
> 3. Can the public be effectively protected by means other than licensure?
>
> 4. Why is licensure the most appropriate form of regulation?
>
> 5. How will the newly licensed category impact upon the statutory and administrative authority and scopes of practice of previously licensed categories in the state?

While the dental profession had reservations about other specific aspects of that document, it did concur that licensure did not appear to be the most appropriate form of regulation for dental assistants.

It should be pointed out that as recently as March 1979, in an address delivered at the Occupational Licensure Conference of the American Enterprise Institute in Washington, D.C., the Chairman of the Federal Trade Commission summarized the concern of that agency about the danger to the public of licensing occupations indiscriminately.

The dental profession believes that before moving in the direction of licensing additional auxiliaries, it should be demonstrated beyond question that any new system will, in fact, correct any perceived problems that exist today.

A voluntary certifiction program for Dental Assistants has been conducted by the Dental Assisting National Board (formerly the Certifying Board of the American Dental Assistants Association) since 1960. This program has been conducted independently of the American Dental Association. While this is a voluntary credential which assesses entry level competence it is also one that has implications for the education of dental assistants. The examination offered by the Dental Assisting National Board is a written examination only; it does not include a clinical examination.

Prior to 1979, graduation from a dental assisting program accredited by the Commission on Dental Accreditation was a prerequisite for taking the certification examination. From 1960 to 1969, graduation from an accredited program was waived for individuals who completed an Extension Study Course of 104 hours. In 1979, the Board declared a three-year waiver of this prerequisite. This waiver was proposed for a period of three years, 1979-1981, to gather data on the equivalence of on-the-job trained dental assistants and those receiving education from formal education programs, both accredited and non-accredited. The results of this study are not yet available from the Dental Assisting National Board.

As of August 31, 1980, the total number of dental assistants certified is 59,245. The total number that has maintained certification is 19,058. During the year ending August 31, 1980, 6,976 individuals were tested by the Dental Assisting National Board. The number of graduates from programs accredited by the Commission on Dental Accreditation during the 1978-79 school year was 6,043.

It can be assmed that the majority of those taking the certification examination are graduates from accredited programs. To the extent this is true and to the extent educators in dental assisting programs are committed to having

their graduates succeed in receiving the entry level credential of being certified, the certification examination has a bearing on the educational process. A test construction committee is formed annually to assist in the preparation of test items. The test committee appointed for 1981 is composed of two dentists and four certified dental assistants. Although none of the states at present licenses dental assistants, seven states have initiated a registration of Dental Assistants. This registration does represent a right or privilege to perform certain intraoral functions and as such it approximates a form of licensure. Two states, Minnesota and Michigan, have made graduation from a Commission on Dental Accreditation program a prerequisite for taking the registration examination. Both of these states had phase-in periods with special courses designed to prepare those already in the work force to qualify for the examinations. Minnesota offers a written examination and spot checks various programs for an examination of clinical skills when such an action appears warranted. Michigan at present has only a written test but plans to include a clinical test in the future.

California has also established a category of Registered Dental Assistants. In order to qualify for the examination, which is a written examination, an applicant must have either completed 18 months experience working as a dental assistant or graduated from an educational program approved by the State Board of Dental Examiners. The examination of the California RDA candidates is conducted by the Dental Assisting National Board through a contract issued by the California State Board of Dental Examiners.

Increased concern about exposure to x-radiation has led states to mandate completion of special training or an examination prior to the exposure of dental radiographic film. Fifteen states require some form of education and eight states (five of those that require education) specify an examination. Appendix V provides the most recent information collected by the Division of Educational Measurements, Council on Dental Education, ADA, 1980.

Beyond the registering of dental assistants and the emphasis being placed on preparation for exposing radiographic film, state practice acts also specify the functions which dental assistants can or cannot perform. Appendix III presents information gained over a six-year period relating to expanded functions delegatable to dental assistants in the various states. The trend towards increased utilization of dental assistants in performing expanded functions continues. The same generalizations can be made as those relating to the dental hygiene figures in the same chart. Some functions are clearly delegatable by a majority of the states

and others are clearly rejected or seen as delegatable by only a small percentage of the states.

Certainly the increased attention focused on radiation has implications for the future education of dental assistants. The number of intraoral functions allowed by a majority of the states also strongly supports the need for formal education of dental assistants because of the increased risk to the patient in the delegation of these functions. These two developments add impetus to the formal systematic education of dental assistants. In the future more dental assistant students can be anticipated for the above two reasons alone apart from any projected manpower needs.

As indicated in Appendix IV, there is not much participation of dental assistants on state boards. Minnesota does have one dental assistant on its board and Michigan has two. The California State Board has delegated dental auxiliary matters to the Committee on Dental Auxiliaries which has dental assistants, dental hygienists and dentists as members.

Licensure and Dental Laboratory Technology

The American Dental Association had a consistent position opposing statutory licensure or registration of dental laboratories and technicians. In 1973, the ADA House of Delegates adopted a new position on dental laboratory licensure which was in effect a position of neutrality. Consequently, dental societies have the discretion of determining whether statutory regulation of dental laboratories and technicians is desirable for their jurisdictions.

Five states have passed legislation that licenses either the laboratory or the technicians or both: Florida, Oklahoma, South Carolina, Texas and Kentucky. Appendix VI is a "Summary of Dental Laboratory/Dental Technician Regulation" as compiled by the Council on Prosthetic Services and Dental Laboratory Relations, in 1976. In 1980, four other states had legislation pending: Illinois, Kentucky, Massachusetts, and Washington. Of these pending bills, the one that is drawing the most attention is Illinois: HB 1257, which would license both laboratories and technicians. This bill is distinguished by the fact that the resulting licensing body would be in the control not of the State Board of Dentistry but of a board composed of four owners of licensed dental laboratories, one registered dental technologist who is not a laboratory owner, one licensed practicing dentist, and one member of the general public who holds no license

issued by the Department. This bill is also distinguished by the fact that it has the support of the Illinois Dental Association.

In order to apply to be a registered dental technologist, it is necessary to have a minimum of five years of practical experience; or to have satisfactorily completed a two-year dental technology course at an accredited college or university, and have three years of practical experience. The law has provisions for tightening the educational requirement five years after the Act becomes effective by requiring "successful completion of a two-year Associate Degree Dental Laboratory Technology Accredited Program plus 60 credits granted for continuing education courses or structured didactic offerings which directly or indirectly relate to the dental laboratory field or a combination thereof."

In general, the fact that only five states currently have legislation that enables licensure of laboratories/technicians, would lead one to conclude that implications for education are negligible. However, the large amount of legislation pending on the practice of denturism may herald more of the type of legislation now pending in Illinois. It is conceivable that many more than five states will have enacted legislation regulating laboratories/technicians in the next ten years.

State practice acts written in the manner of the pending Illinois HB 1257 would certainly influence educational planners.

The National Board for Certification since 1958 has offered an examination to dental laboratory technicians. To be a candidate for certification one must have a high school education or the equivalent and have satisfactory standing in the dental technology field. Five year of experience is required. Time spent in approved supervised training in a dental laboratory school may be substituted for part of the experience. If, for example, a candidate is a graduate of a two-year dental laboratory technology program, these two years plus three years of actual experience would qualify the student to take the examination.

Certified Dental Technicians (CDT) must renew their certification yearly and must meet continuing education requirements set by the National Board for Certification.

Recognized graduates of accredited programs are allowed to take the basic examination upon completion of their program of study. Those candidates for the CDT who are not recognized graduates must wait until their five years of experience in a dental laboratory have been completed prior to taking the basic exam. The basic exam is a written test which covers history, ethics, and jurisdiction, the dental laboratory industry, plus techniques, procedures and

materials fundamental to all of the laboratory specialties.

The specialty examination consists of written and practical examinations in the field of the candidates' choice and may be complete dentures, partial dentures, crown and bridge, ceramics or orthodontics.

The fact that graduation from an accredited program does not by itself qualify a candidate to be eligible for the certification exam to some extent lessens the impact of certification on the educational process. Candidates for certification, on the other hand, might see the distinct advantages of being able to complete the basic examination upon completion of their program of study.

As the importance of certification increases, the linkage that the certification exam provids between entry level job skills and the educational process will continue to be influenced by education and practice.

Accreditation of Dental Auxiliary Programs

Institutional and specialized accreditation are distinguished primarily by their scope of operation. Institutional accreditation has, as its scope, the totality of an institution as it defines itself. While institutional accreditation determines that each part of the institution is contributing to the achievement of the institution's educational objectives, it does not necessarily evaluate specific units or programs. Specialized accrediting agencies are directly concerned with the quality of education in particular professional/occupational fields and evaluate specific units or programs.

The development of specialized accreditation parallels the development of the various professional/occupational areas. As society gradually demanded the services of specific groups which possessed a unique set of knowledge and skills, the need arose for educational curricula which would adequately prepare the practitioners sought by society. Specialized accreditation responded to the public's need to know which institutions offer acceptable education for the professional/occupational practitioners.

Specialized accreditation reviews some of the same aspects of an educational institution as does institutional accreditation. However, these institutional factors are evaluated only insofar as they influence the quality of education at the program level. The main focus of specialized accreditation, and the major source of its societal contribution, is on the evaluation of education at the program level and particularly on the specialized curriculum. The standards and the process by

which the program is evaluated reflect the expertise of the professions or occupations. Specialized accreditation is distinguished from institutional accreditation by its services to career-oriented students, specialized faculty, practitioners in the profession and their professional association, certification, registration, and licensing bodies, and government funding agencies.

The basic role of specialized accreditation then is to signify that: 1) there is an individualized course of instruction for a given occupation which comprises unique skills and knowledge for the satisfactory performance of the vocation; 2) educational standards are developed through an accurate reflection of the current needs of the occupation and/or employer; 3) an evaluation system is established and conducted to identify and recognize publicly those programs which meet the reasonably established national educational standards.

The manner in which specialized standards are formulated and the manner in which these standards are applied are important. Since these standards are national minimal standards they must be formulated in consultation with a broad community of interests including those person, institutions, and organizations which will be significantly affected by the standards. A pre-condition to the acceptance of standards is the participation of interested parties in their development. Likewise, the implementation of the accreditation process should involve participation of the broad community of interest. Significant benefits to society result from the collaboration of all who compose the community of interest.

The Public is Served: National minimal standards assure that certain acceptable levels of quality have been met. Accreditation can then provide the public with the assurance that an educational program meets or exceeds acceptable standards. Nationwide expectations for competent professionals and occupational specialists who work for public health, safety, and welfare are best met if the same criteria for appraisal are used in each program. Consistency of education is particularly important in a mobile work force; specialized accreditation fosters such consistency.

Students are Served: Students can determine, prior to enrollment, whether an educational program has the resources to prepare them adequately for a selected occupation. While is is true that graduation from an accredited program does not guarantee employment, the graduates should at least be assured that both practitioners in their prospective occupations and those who employ their services, have diligently exercised conscious judgment that their academic preparation meets acceptable national standards of both quality and relevance and equips them

with acceptable entry level skills.

Faculty are Served: The accreditation process has served as a catalyst for reviewing and improving course offerings. This is accomplished through the self-study mechanism completed by those conducting an educational program and through the site visit. Accreditation standards require program faculty to review and revise the curriulum periodically.

The accreditation process through the self-study and site visit permits peer consultation and support. Site visitors are able to share their expertise when appropriate. The standards require the establishment of student learning objectives and the development of evaluation instruments to assess the attainment of these objectives, so that outcomes can be measured in relation to professional/occupational practice.

Employers are Served: Accreditation performs the function of assuring potential employers that graduates of accredited programs do in fact have the professionally determined and desired skills needed for entry into an occupation and to perform productively, competently, and efficiently.

Communication between practitioners and educators is necessary to keep education current with the changing needs of the professions and to address career goals realistically. To remain current, standards must be revised periodically utilizing the resources of the wide community of interest.

Certification and Licensing Bodies are Served: Certification and licensure provide a second level of protection to the public by assessing entry level skills of individuals seeking employment. There is no substitute for carefully designed formal education programs, particularly in health related disciplines. Accreditation standards should guide certifying and licensing agencies in the establishment of levels of knowledge and skills to be tested. It seems reasonable, therefore, to preserve unanimity of agreement on what constitutes the basic entry level skills necessary for meeting established criteria for professional credentialing mechanisms whether they be for accreditation or certification.

Educational Institutions are Served: In addition to the assistance that educational institutions receive in discharging the obligation to public accountability, there is the visibility which is gained for quality professional/occupational programs which meet specialized accreditation standards. The assurance that a professional/occupational program receives and meets peer evaluation, compliments and strengthens the institution's own program review mechanisms. The institution is also given recognition in the educational

community.

The resolution of questions relating to transferability of credits or courses is also assisted through the specialized accreditation process.

Specialized accreditation provides unique services to the public, students, faculties, employers, certification and licensing bodies, and educational institutions. As an agent which assists educational institutions in meeting their obligations to be accountable, specialized accreditation must readily acknowledge its own obligation for providing its services accountably. Standards and procedures must be reveiwed and improved to increase efficiency and improve effectiveness.

Number of Dental Auxiliary Programs Accredited: As of May 1980, there are 200 accredited dental hygiene programs, 296 accredited dental assisting programs and 57 dental laboratory technology programs. Appendix VII depicts the increase in the number of accredited dental hygiene and dental assisting programs since 1953. The current number of 57 dental laboratory technology programs shows an increase from 41 in 1975, 31 in 1971, four in 1961, and four in 1951.

Revision of Standards for Dental Hygiene, Dental Assisting and Dental Laboratory Technology

The accreditation standards utilized by the Commission have recently been revised and are scheduled to go into effect January 1, 1981.

In an effort to provide the community of interests with appropriate input into the revision process, the Commission utilized the following procedures. The process included: appointment of an advisory committee; convening of a national invitational workshop; holding of an open hearing; wide distribution of two separate drafts of the standards; submission of these drafts to the ADA House of Delegates for review and comment; and consideration of the revised documents for Commission approval in December 1979.

Three advisory committees were appointed by the Commission to assist in the revision process. The advisory committees for dental assisting and dental hygiene were comprised of appropriate membership including Commission representatives and representatives of the American Dental Assistants Association, the American Dental Hygienists Association, the American Association of Dental Schools and the dental profession. The third advisory committee, which was responsible for developing the revised accreditation standards for dental laboratory technology education programs, consisted of a Commission member, representatives of the

National Association of Dental Laboratories and dental laboratory technology educators.

The national invitational conference, which was held in Chicago in August 1978, was attended by approximately 400 participants. Conferees included constituent society representatives, directors of dental assisting and dental hygiene programs, and representatives from other interested organizations. The purpose of the conference was to receive input into the development of the revised document from the respective community of interests. In February 1979, drafts of the proposed standards or requirements were circulated widely to those who would be affected by the revised standards. Those who received the revised standards included constituent dental societies, state boards of dentistry, educators, professional organizations, chief administrators of educational institutions offering dental assisting, dental hygiene and dental laboratory technology programs, and program directors.

Comments received during the Commission's open hearing held in conjunction with the American Association of Dental Schools' annual meeting in New Orleans in March 1979, as well as comments submitted by letter, were reviewed by the advisory committees and pertinent revisions were made in the drafts. The changed drafts were then submitted to the Commission at its meeting in May 1979 for preliminary aproval. In June 1979, the draft versions of the standards, as amended by the Commission, were again widely distributed to constitutent dental societies, state boards of dentistry, educational program directors and other affected and interested individuals and organizations.

The dental profession provided its comments and suggestions on the proposed new standards during the Reference Committee hearing. Oral and written comments from all sources were considered by the Commission at its December 1979 meeting, at which time it approved the new standards.

Accreditation standards for Dental Assisting Education Programs were first established in 1960 and then revised in 1969, 1973, and 1979. Dental Hygiene Standards were approved first in 1947 and revised in 1969, 1973, and 1979. Dental Laboratory Technology Standards were first approved in 1946 and revised in 1957, 1967, 1973, and 1979.

The regular and frequent revision of these standards has some implications for this committee. Each time the standards were revised the intent was to involve a large community of interest in looking ahead for a period of approximately 4-5 years to anticipate the direction of dental auxiliary education. Whereas licensure

attempts to play a follower role, testing those areas wich are being taught in programs, accreditation attempts to keep pace with and sense the short run future of dental auxiliary education. The new standards should be of service to this committee insofar as the content of these standards reflects what a wide community believes ought to be the case in dental auxiliary education over the next four to five years.

Since the process of revising the accreditation standards for dental hygiene, dental assisting, and dental laboratory technology has recently been completed, it might be of interest to this committee to know what problems were encountered along the way.

One of the immediate problems to be faced was that of the degree of specificity/non-specificity that should be incorporated in the language of the standards. It might be postulted that academic freedom and institutional freedom would be best served by wording standards in broad, general terms, placing the responsibility for educational quality squarely on the shoulders of the educators. The resounding response of the educators was in favor of specificity. Educators were concerned that school administrators who lacked technical understanding of dentistry would not support program needs unless the standards were specific and explicit. Since the majority of dental auxiliary programs exist in non-dental school settings, there was strong resistance to making the standards less specific. The resulting standards are a compromise attempt to retain needed specificity but to allow increased academic and institutional freedom where possible.

Drafting national minimal standards when so much variance exists between state practice acts also posed a problem. This problem was especially acute when addressing the teaching of intraoral functions in dental hygiene and dental assisting programs. To what extent might the Commission require programs to teach functions that were not delegatable or delegatable within a particular licensing jurisdiction? States disagree as to which functions are traditional and which are non-traditional.

The problem was resolved in dental hygiene by stipulating that dental hygiene programs select which functions are to be taught and then identify these functions for the Commission. During the accreditation process attention is focused on the identified functions to insure that students are provided with the basic background knowledge and an appropriate level of clinical experience to insure competency.

The problem was treated differently in accreditation standards for dental assisting. In order to provide consistency in dental assisting programs and to

provide a base nationally for an understanding of what functions a dental assistant graduate of an accredited program can perform, a list of traditional functions is included in the dental assisting standards which must be taught to clinical competency within the parameters of individual state laws. The functions listed are accepted in more than one-half of the licensing jurisdictions. Advanced functions in the dental assisting standards are those functions not included among those listed in the traditional or basic functions identified in the document. The teaching of advanced functions is not mandatory. However, the inclusion of advanced functions in the curriculum must not compromise the quality of the traditional or basic program. All advanced functions included in the curriculum must be taught to the level of laboratory competence. Also, if these functions are delegated to dental assistants or dental hygienists in the licensing jurisdiction in which the educational institution is located, the program must ensure that each student attain clinical competence in performing each specific function. If any functions are not being taught to clinical competency, it must be publicly stated that the function is being taught only to laboratory competence and students must be made aware of the ethical and legal ramifications.

Another problem addressed in the standards revision process was the question of the appropriate education setting for a dental auxiliary program. The standards still require that programs be housed in an accredited institution which has a primary mission of providing postsecondary education. To be sure there were those who spoke for changing this standard but the overwhelming opinion of those engaged in the process of revision was to retain it as it was. The current standards encourage accredited programs to make provisions for advanced placement for those qualified by previous education or experience. Attempts to improve articulation between high school programs and postsecondary programs should be encouraged.

In 1975, the Commission conducted a study to determine whether high school dental assisting programs were equivalent to postsecondary programs. The conclusions and recommendations of that study are included as Appendix VIII .

While not necessarily raised as a topic for discussion during the standard revision process, some mention should be made of ladder-type programs and the experience of the Commission. Most frequently the ladder approach as assessed by the Commission involves dental assisting and dental hygiene education, with dental assisting occupying the lower range on the ladder.

It has been speculated for twenty to thirty years that these two disciplines could be learned with less expense and time if taught consecutively with certain core courses doubling for the needs of both disciplines. For all that has been writtten of the ladder approach to these disciplines, there are only three instances among those institutions accredited by the Commission where the ladder approach is employed. The Commission allows for and encourages innovative approaches to the education of auxiliaries and as such is not predisposed to deny accreditation to ladder-type programs. There are difficulties with the ladder appraoch which must be noted.

The level of instruction and the depth of instruction vary at the different rungs of the ladder. The dental assistant student does not require the same level and depth of chemistry, for example, as does the dental hygiene student who will be more involved in counseling patients as to their nutritional needs. Therefore, it is difficult to plan core courses which addresss evenly the needs of both disciplines.

The kinds of learning experiences needed by each discipline also differs. The dental hygienist student needs more didactic knowledge of dental materials than the dental assistant but the dental assistant needs more practice in the manipulation of dental materials than does the dental hygienist.

If the intent of the ladder approach is to produce an individual who is both assistant and hygienist, the results appear unsatisfactory. The graduate tends to assume the identity of assistant or hygienist, more often hygienist.

If the intent of the ladder approach is to compress the two courses of study into shorter time, this goal is not readily achieved. These observations on the difficulty in planning and implementing ladder approaches to learning are not made to discourage this committee if it intends to pursue such an avenue, but rather to point out difficulties that might occur on the discipline specific instructional level.

Conclusion

As this Committee plans for the education of occupational allied health practitioners, it wonders how much its task may be impeded by licensure and accreditation.

State Practice Acts certainly have a lot to say about what functions are legally delegatable and what type of supervision is required. The State Practice Act obviously must influence your efforts. The licensure examination, at least as viewed by the Joint Commission on National Dental Examinations, plays a follower

role and as such its effect on your task is not restrictive. Accreditation standards do occupy an important place in the credentialing process. However, these standards seek only to anticipate by 4-5 years the directions of auxiliary education and can serve as guideposts to you as you look beyond them to the year 2,000.

APPENDIX I

Regional Clinical Testing Services

Central Regional Dental Testing Service

Colorado (5 yrs)
Iowa (5 yrs)
Kansas (5 yrs)
Minnesota (5 yrs)
Missouri (5 yrs)
Nebraska (5 yrs)
North Dakota (5 yrs)
Oklahoma (5 yrs)
South Dakota (5 yrs)
Wisconsin (5 yrs)
Wyoming (5 yrs)

Northeast Regional Board

Connecticut (5 yrs)
District of Columbia (5 yrs)
Illinois (5 yrs)
Maine (5 yrs)
Maryland (5 yrs)
Massachusetts (5 yrs)
Michigan (not established)
New Hampshire (5 yrs)
New Jersey (10 yrs)
New York (10 yrs)
Ohio (5 yrs)
Pennsylvania (5 yrs)
Rhode Island (none)
Vermont (5 yrs)- Also recognizes CRDTS results
West Virginia (5 yrs)

Southern Regional Testing Agency

Arkansas (5 yrs)
Kentucky (5 yrs)
Tennessee (5 yrs)
Virginia (5 yrs)

Western Regional Examining Board

Montana (3 yrs)
Utah (3 yrs)
Montana (3 yrs)
Oregon (3 yrs)
Arizona (anticipates participation beginning June, 1979)

APPENDIX II

OUTLINS

for

Joint Commission on National Dental Examinations

FUNCTIONS AND CATEGORIES

Functions are listed on the left; categories on the right.

Category A = Background information (for recognizing why and when the function is performed)
Category B = Method - technique (or how the function is performed)
Category C = Armamentarium (design, care and use of equipment and materials)

( ) = number of test items in a 350-item examination

		A	B	C
I.	PERFORMING ORAL INSPECTION (52)	(38)	(12)	(2)
1.	Extra-oral inspection and charting (4)			
a.	Observing external features (3) (gait, skin, eyes, etc.)	3	0	0
b.	Palpation (1)	0	1	0
2.	Intra-oral inspection and charting (31)			
a.	Mucosal (11)	9	2	0
b.	Periodontal (9)	6	3	0
c.	Dental (7)	4	2	1
d.	Occlusion (4)	3	1	0
3.	Identifying oral habits (4)	3	1	0
4.	Locating and identifying stain and deposits (9)	7	1	1
5.	Evaluating oral hygiene status (4)	3	1	0
II.	EXPOSING AND PROCESSING RADIOGRAPHS (45)	(29)	(11)	(5)
1.	Exposing and evaluating (12)			
a.	Intra-oral (11)	5	4	2
b.	Extra-oral (1)	1	0	0
2.	Applying radiation hygiene (13)	8	3	1
3.	Processing (4)	0	3	1
4.	Mounting (4)	3	1	0
5.	Recognizing and reporting abnormalities (12)	12	0	0
III.	PROVIDING OTHER DIAGNOSTIC AIDS (32)	(23)	(7)	(2)
1.	Obtaining medical and dental health histories (18) (tests, vital signs, emotional status, etc.)	16	2	0
2.	Preparing study casts (9)			
a.	Take impressions (7)	3	2	2
b.	Pour, trim and mount (2)	1	1	0
3.	Clinical testing (5) (thermal, vitalometer, percussion, transillumination, caries activity, cytologic smear, etc.)	3	2	0
IV.	PERFORMING PROPHYLAXIS (43)	(19)	(17)	(7)
1.	Scaling and root planing (30)	12	12	6
2.	Soft tissue curettage (9)	6	3	0
3.	Polishing (coronal surfaces and appliances) (4)	1	2	1
V.	APPLYING TOPICAL AGENTS (18)	(12)	(4)	(2)
1.	Caries preventive (9)	6	2	1
2.	Caries arresting (3)	3	0	0
3.	Anesthetic (3)	2	1	0
4.	Tooth Desensitizing (3)	1	1	1

VI.	PROVIDING INDIVIDUAL ORAL HEALTH INSTRUCTION (56) (INCLUDING NUTRITION AND PLAQUE CONTROL)	(36)	(18)	(2)
1.	Identifying needs for counseling (24)	19	5	0
2.	Planning instruction (13)	13	0	0
3.	Providing instruction (10)	0	8	2
4.	Evaluating instruction (9)	4	5	0

		A	B	C
VII.	PROVIDING SUPPORTIVE TREATMENT SERVICES (46)	(16)	(19)	(11)
1.	Dental assisting - including sterilization (18)	8	8	4
2.	Removing sutures (2)	1	1	0
3.	Removing excess restorative materials (5)	2	2	1
4.	Endodontic procedures (2)	2	0	0
5.	Placing and removing surgical dressing (5)	1	4	0
6.	Placing and removing temporary restorations in prepared cavities (5)	1	2	2
7.	Polishing restorations (9)	1	4	4
VIII.	ASSISTING IN EMERGENCIES (28)	(17)	(9)	(2)
1.	Recognizing potential for emergency situations (9)	9	0	0
2.	Recognizing an emergency situation (8)	8	0	0
3.	Providing emergency care (11)	0	9	2
IX.	PARTICIPATING IN COMMUNITY HEALTH ACTIVITIES (30)	(14)	(16)	(0)
1.	Preliminary research (11)			
a.	Identifying target population (1)	1	0	0
b.	Identifying and measuring factors which influence oral health status (i.e. attitude, motivation, social and political factors) (6)	3	3	0
c.	Establishing channels of communication to promote cooperation (2)	1	1	0
d.	Determining oral health needs (2)	1	1	0
2.	Project planning and operation (10)			
a.	Defining project objectives (3)	2	1	0
b.	Developing project design (2)	1	1	0
c.	Identifying and gathering resources (1)	0	1	0
d.	Selecting appropriate tools and media (3)	1	2	0
e.	Conducting activity (1)	0	1	0
3.	Project evaluation (9)			
a.	Gathering and analyzing project information (3)	1	2	0
b.	Comparing project results with preliminary data (3)	1	2	0
c.	Determining the extent to which project objectives were achieved (3)	2	1	0

February 1978

APPENDIX III

PERCENTAGE OF RESPONDING JURISDICTIONS THAT ALLOW EXPANDED FUNCTIONS IN DENTAL ASSISTING AND DENTAL HYGIENE

List of Functions	Dental Assisting			Dental Hygiene		
	1980	1977	1975	1980	1977	1975
Make radiographs	98	92	82	*	*	*
Take impressions for study casts	67	58	46	80	79	69
Place periodontal dressings	39	31	25	72	66	53
Remove periodontal and surgical dressings	69	61	54	92	86	80
Remove sutures	72	65	64	84	82	80
Apply topical anesthetic agents	65	59	51	*	*	*
Inspecting oral cavity	37	33	23	*	*	*
Polish coronal surfaces of teeth	37	40	37	*	*	*
Apply anticariogenic agents topically (i.e., fluoride)	63	55	63	*	*	*
Administer local anesthetic agents	0	0	0	18	17	22
Place rubber dam	84	79	70	88	79	79
Remove rubber dam	84	77	69	88	80	75
Place matrix	65	58	39	65	58	53
Remove matrix	65	54	49	65	54	53
Place temporary restorations	43	39	23	65	63	50
Remove temporary restorations	41	35	23	57	53	41
Place amalgam restorations	14	13	13	18	17	17
Carve amalgam restorations	16	15	11	20	19	19
Polish amalgam restorations	37	36	28	82	80	72
Place and finish composite, resin or silicate cement restorations	12	11	.08	18	17	16
Remove excess cement from coronal surfaces of teeth	65	60	.49	*	*	*
Applying pit & fissure sealants	27	29		61	29	
Applying cavity liners and bases	27	27		43	61	
Root planing	*	*		78	42	
Closed soft tissue curettage	*	*		63	72	
Administration of nitrous oxide	.09			18	59	

*Denotes functions which are considered traditional for Dental Hygiene

Number of jurisdictions reporting in 1980, 51; 1977, 50-52; 1975, 40-47.

Data collected by the Division of Educational Measurements, Council on Dental Education, American Dental Association, 1975, 1977, 1980.

APPENDIX IV

TABLE OF PERCENTAGES

Summary of Composition of State Dentistry Examining Boards

	MEMBERSHIP			
	Membership not provided %	Full voting powers %	Limited voting powers %	Membership pending %
A. Dentists	-	100	-	-
B. Dental Hygienists	44	28	22	6
C. Dental Assistants	96	2	2	-
D. Dental Technicians	100	-	-	-
E. Public/ Consumers	42	36	14	8
F. Other	96	4	-	-

NOTE: Eleven states (22%) provide for advisory and/or consulting services of dentists and/or auxiliary groups

Wisconsin Dental Association, 1979

Appendix V

Dental Assisting

MAKING RADIOGRAPHIC EXPOSURES

STATE	NOT PERMITTED	PERMITTED FOR	REQUIRED EDUCATION	REQUIRED STATE BOARD EXAMINATION	REQUIRED SUPERVISION
Alabama		All	None	None	Indirect
Alaska		All	None	None	Undefined
Arizona		All*	EFTC	W & Cl	Indirect
Arkansas		All	None	None	Indirect
California		All	EFTC	None	General
Colorado		All	None	None	General
Connecticut		All	None	None	General
Delaware		All	None	None	General
Dist. Columbia	X				
Florida		All	None	None	Direct
Georgia		All	None	None	Direct
Hawaii		All	None	None	Direct
Idaho		All	None	None	Not Specified
Illinois		All	Trained approp.	None	Indirect
Indiana		All	None	None	Indirect
Iowa		All	None	None	Direct
Kansas		All	None	None	Indirect
Kentucky		All	EFTC	None	Indirect
Louisiana		All	None	None	Direct
Maine		All	None	None	General
Maryland		C & R	EFTC**	W & Cl	Not Specified
Massachusetts		All	None	None	Indirect
Michigan		All	EFTC	W & Cl	Indirect
Minnesota		RDA	EFTC	W	Indirect
Mississippi		All	None	None	Direct
Missouri		All	None	None	Indirect
Montana		(6 mos. exp.)	EFTC	MDA	Indirect
Nebraska		All	EFTC	None	Indirect
Nevada		All	None	None	Direct
New Hampshire		All	EFTC	None	Indirect
New Jersey		C & R	None	***	Not Specified
New Mexico		All	None	None	Indirect
New York		All	None	None	General
North Carolina		All	EFTC	None	Indirect
North Dakota		CDA	Acc. Prog.	Proof of course	Indirect
Ohio		All	None	None	Indirect
Oklahoma		All	EFTC	None	Indirect
Oregon		All	None	W & Cl	Indirect
Pennsylvania		All	None	None	Not Specified
Rhode Island		All	None	None	Not Specified
South Carolina		All	None	None	Indirect
South Dakota		All	None	None	Direct
Tennessee		RDA	EFTC	W	Indirect
Texas		All	None	None	General
Utah		All	None	None	Not Specified
Vermont		C or R	EFTC	None	Indirect
Virginia		All	None	None	Direct
Washington		All	None	None	General
West Virginia		All	None	None	Undefined
Wisconsin		All	None	None	Direct
Wyoming		All	None	None	Indirect
Puerto Rico			PRESENTLY BEING UPDATED		

* Certified by State Board after taking an approved exam.

** Not required for Certified Dental Assistants or graduates of accredited programs.

*** Exam given by Environmental Protection Department.

MDA Examined by Montana Dental Association.

APPENDIX VI

SUMMARY OF DENTAL LABORATORY/DENTAL TECHNICIAN REGULATION

State (Date Enacted)	Regulation of Laboratory and Owner/Manager	Separate Board of Dental Lab. Technology	Composition	Method of Appointment	Length of Appointment	Certification Required	Amount of Education Required	Amount of Experience Required	Examination Required	Inspection Required	Annual Fee	Dentist and Office Laboratory Exempt	Prevents Dentist from Owning Comm. Lab.
Florida (1957)	No[a]	No	N/A*	N/A	N/A	No	None	None	No	Yes	$10	Yes	No
Oklahoma (1959)	Yes[b]	No	N/A	N/A	N/A	No	None	None	No	Yes[c]	$20 max.	Yes	Yes
South Carolina (1966)	No[d]	No	N/A	N/A	N/A	No	(e)	(e)	Yes[f]	Yes[c]	$15	Yes	No
Texas (1973)	Yes[g]	No[h]	6[i]	State Board	6 years	No	(t)	(t)	Yes	Yes[c]	(r)	Yes[s]	No
Kentucky (1974)	Yes[g]	No[h]	6[j]	State Board	4 years	Unspecified	Unspecified	Unspecified	No	No	$10-$100 Lab. $5 - $20 Tech.	No	No
Rhode Island**	Yes	Yes	3	Governor	3 years	Yes	Unspecified	2 years	No	Yes	$10[k]	Yes	No
New York**	Yes	Yes	5[l]	Bd. of Regents	5 years	No	(e)	(e)	Yes[f]	No	(m)	Yes	No
Massachusetts**	Yes[g]	Yes	3	Governor	3 years	Yes	Unspecified	2 years	No	Yes	$30	Yes	No
Pennsylvania**	Yes	Yes	7[m]	Governor	7 years	Yes	Unspecified	Unspecified	No	Yes	Unspecified	Yes	Yes
North Carolina***	Yes[g]	No[h]	9[e]	State Board	3 years[p]	No	(e)	(e)	Yes	No	(q)	Yes	No
California**	Yes	No[h]	7[u]	State Board	3 years	No	(v)	(v)	No	Yes	(w)	Yes[s]	No
Florida***	Yes	Yes	3	Governor	3 years	Yes	Unspecified	Unspecified	No	Yes	Unspecified	Yes	No
NADL "Model Bill"	Yes	Yes	5	Governor	3 years	Yes	None	5 years	Yes	No	Unspecified	Yes	Yes
Dental Laboratory Conf. "Model Bill"	No[a]	Yes	(x)	Unspecified	Unspecified	No	(y)	(y)	No	Yes	Unspecified	Unspecified	Unspecified

(a) laboratory only
(b) laboratory permit; technicians registered with Board of Governors
(c) work orders, models and appliances
(d) technicians only
(e) high school diploma, or equivalent and 2-year formal education course or 3 years experience
(f) new applicants only
(g) all employees must be registered
(h) advisory board
(i) 4 owners; 2 non-owners
(j) 4 owners or managers; 2 non-owners
(k) original license - $25
(l) 3 licensed technicians; 2 state board members
(m) Examination fee - $30; $20 - apprentice card for individuals with less than 2 years experience; $10 - apprentice card for individuals with no experience; $100 - laboratory (biennial); $100 - technician renewal (biennial)
(n) 3 laboratory owners; 1 licensed dental technician; 2 consumer representatives; 1 practicing dentist
(o) 4 laboratory owners; 2 non-owners; 2 dentists
(p) dentists-members - 4 year terms
(q) $25 maximum examination fee; $35 maximum technician registration; operator - $10 to $100
(r) laboratory - $25 to $200; technician - $10 to $25; examination fee - unspecified
(s) technician(s) must register
(t) to be a laboratory owner: 2 years formal education and 2 years practicial experience or 5 years practical experience
(u) no more than 4 members may be laboratory owners or managers
(v) technician - high school graduate or equivalent, unspecified additional education and training; laboratory manager or owner - most unspecified technician requirements and have five years experience
(w) laboratory registration and renewal - $250 maximum; dental technician registration and renewal - $50 maximum
(x) individuals without proprietary interests in any dental or dental related field
(y) demonstrated compliance with all applicable federal, state and local laws

* Not Applicable

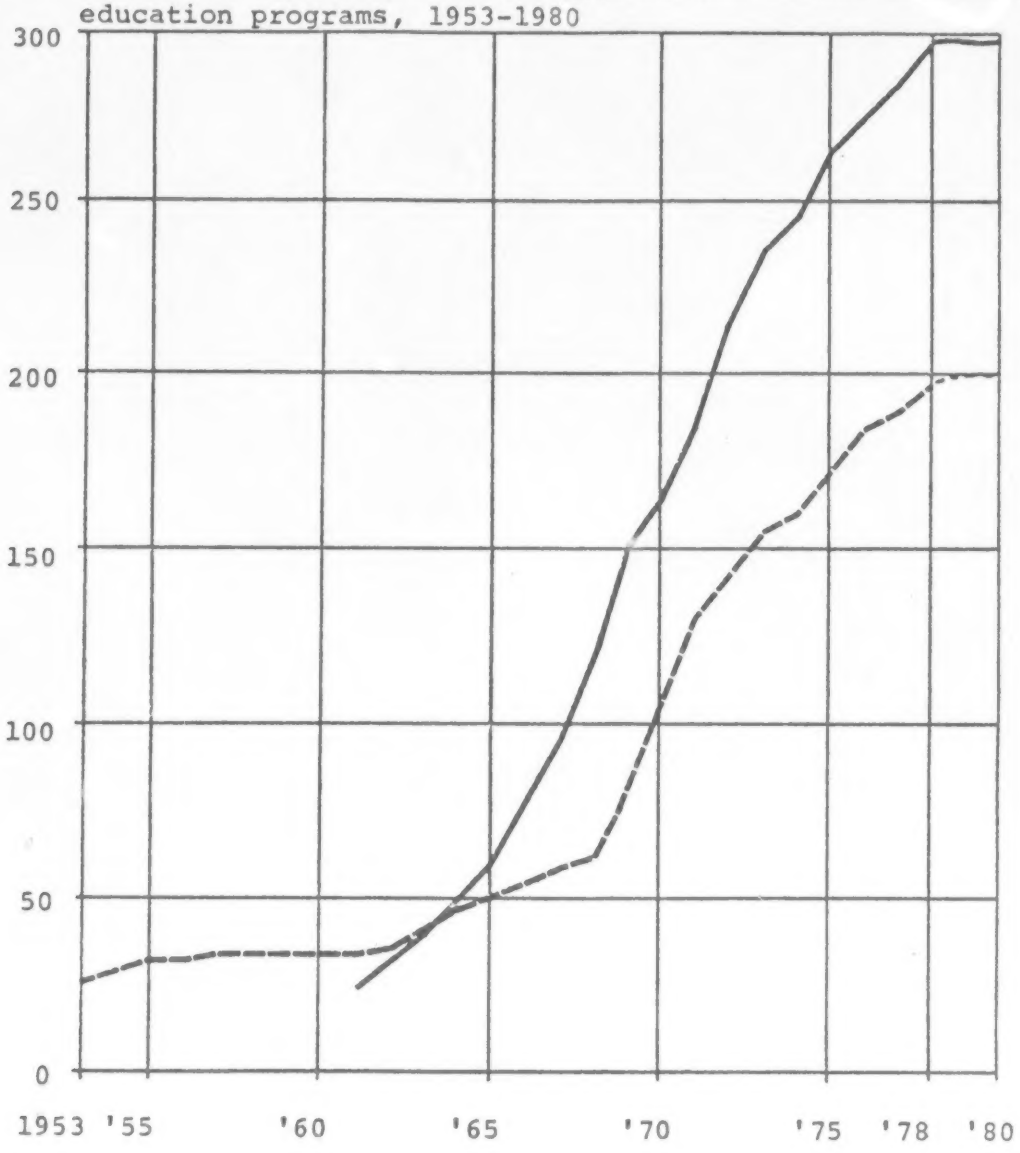
** Introduced, not passed

*** Proposed to dental society only

(775)

APPENDIX VII

Number of accredited dental hygiene and dental assisting education programs, 1953-1980



The above figures represent the number of accredited programs as of the annual June or May accreditation actions of the Council on Dental Education/Commission on Accreditation of Dental and Dental Auxiliary Educational Programs.

References

American Dental Hygienists Association - A Comparative Review of 51 Practice Acts, 1979.

Shimberg, Benjamin, etal, Occupational Licensing: Practices and Policies. A report of the Educational Testing Service. Public Affairs Press, Washington, D.C., 1972.

APPENDIX VIII

CONCLUSIONS AND RECOMMENDATIONS

There are established and logical differences between secondary and postsecondary educational systems. The systems are not independent of each other, nor is one meant to be a substitute for another. The objectives and scope of high school health occupations programs, including dental assisting programs, reflect the philosophy, objectives and offerings of the secondary educational system and vocational-technical education. High school vocational education programs have a unique and valuable contribution to make. However, the role of high school health occupations programs, including dental assisting, has not been differentiated from that of postsecondary programs. The Council on Dental Education has clearly defined the role of postsecondary dental assisting education and believes that the role of high school dental assisting education should be defined by the concerned educational institutions with guidance from postsecondary institutions, dentistry and dental assisting.

High school programs with the goal of preparing an individual for employment in the broad field of dentistry should offer curriculums which reflect the resources and level of education offered in the high school and compliment postsecondary curriculums. Such programs can and are, in many instances, effectively preparing clinical support personnel, that is, individuals who are capable of preparing and dismissing patients, sterilizing and disinfecting instruments, preparing tray set-ups and the operatory for dental procedures, processing and mounting dental radiographs, and performing basic laboratory procedures such as pouring and trimming study casts. These functions do not require postsecondary science background, and training in them is of benefit to the individual and the employing dentist.

High school programs can provide an opportunity for students to explore health careers. This goal should not be at the expense of preparing the individual for entrance into a health career of choice, and therefore, cannot be independent of providing the student with prerequisite educational background for pursuing college-level education in the discipline. In the Council's view, those high school programs which have as a goal the preparation of individuals for admission to dental hygiene and dental programs should adjust their goals. With substitution of vocational education for college preparatory courses in sciences, this goal is not achievable or appropriate.

Postsecondary science is required for advancing in the broad field of dentistry, and into intraoral procedures. The ability of the postsecondary educational institution to offer science instruction that will provide broad mobility for the student will depend upon the type of institution and its goals and objectives.

Administrators and faculty of secondary vocational schools should take the initiative to contact postsecondary educational institutions which offer accredited dental assisting programs to study the possibility of articulation. Efficient and economical use of state resources demands articulation between the two types of programs to the extent possible. The unique goals and resources of each setting should be identified, and the goals of the high school dental assisting programs adjusted accordingly. Extensive discussion and planning are needed to coordinate the content and learning experiences of the programs at both levels, to allow for students' exemption from certain aspects of postsecondary programs, and reduce the time required for completion of graduation requirements and certification eligibility requirements. Postsecondary institutions entering into articulation agreements should develop mechanisms for measuring students' knowledge and skills to allow advanced placement and assure that such placement is based on reliable and valid measurements. The Council on Dental Education believes that meaningful articulation can benefit the students, the programs and the profession.

Report on the Study of High School Dental Assisting Programs, Council on Dental Education, American Dental Association, May 1975.

LICENSING AND CREDENTIALING: HOW MUCH GOVERNMENTAL INTRUSION IS NECESSARY?

Mark Thomas, Counsel
New York State Senate Health Committee

The federal moratorium on new licensing of practice groups was officially adopted in New York for the first half of the last decade. However, the impact of that moratorium is still with us today: very few proposals to enact new licensing laws were adopted in New York State in that late 1970's. The general policy continues to be a disinclination to create new statutory provider classifications with the complement of regulations which accompany licensure laws. The following is a discussion of the customary legislative response to a call for licensure. While certain situations require that a great deal of attention is centered on only one or two of the many areas requiring scrutiny, the method described herein is the usual one followed by legislators who work intimately with licensure proposals.

Is the public's health and safety being harmed by the activities of certain individuals or groups and is licensure of a particular occupational group the most expedient and effective method for redressing this harm? This essential question lies at the root of the legislative analysis of any proposal to license a category of providers. Answering this question requires an exhaustive and complex examination of: a) existing problems with the delivery of care by members of the group, b) alternatives to licensure which have been attempted or considered and c) the impact licensure will have on administrative agencies, the public in general, and the health care delivery system in particular. Only after a thorough study of these factors and the many issues involved in each, will the decision to license, and thus regulate, be made.

I. Why is Licensure Needed?

The threshold of any inquiry into the merits of licensure is an assessment of the public need for a regulatory scheme. Mere reiteration that the public's health and safety will be protected by licensure is unpersuasive. Rather, a precise determination of the nature and seriousness of the need for statutory protection is necessary. The fundamental question is whether consumers' health, safety, or economic well-being are jeopardized by the provision of services by a particular

occupational group, i.e., would the public be harmed in some identifiable way because the provider group is not licensed or regulated? If the impetus for licensure flows from an apparent desire only to garner economic incentives which licensing would provide, then the purpose for enactment is not fulfilled.

Determining harm to the public invites an examination of the mode of service the group provides. Do these practitioners customarily work independently, often making important decision on their own, or do they work under the supervision of another, licensed person? The need for regulation is more compelling where those to be regulated have a high degree of autonomy and are directly serving members of the public who generally are unable to evaluate the qualifications and competency of the provider. If members of the group must be directly accountable to other members of the health care system for the quality of services rendered, then the need for accountability via governmental regulation is less intense. Alternatively, if professionals working in areas related to functions of the occupational group recognize that licensure of the group is needed for improvement of the overall delivery of care, this observation is of primary importance.

Since it may be postulated that the public is harmed when the quality or efficiency of delivery of services are below levels which could be attained, licensure may be sought as a technique for improving the sufficiency of services which are provided. However, it is still necessary to demonstrate the cause and effect relationship between licensure and quality of care. This holds true whether the harm to the public is comissive (persons are being injured due to poor care) or omissive (the quality of service is not as high as it could be). Thus, proponents of licensure must first evaluate present shortcomings and relate these to the need for licensure and regulation.

II. Alternative to Licensure

Licensing and concomitant regulation are generally regarded as the governmental actions of last resort. They place both restrictions and benefits on those in and out of the occupation and intimately involve the government in the activities of the regulated group. Thus, even, if there are persuasive reasons for addressing an acknowledged need, licensure may not be the most appropriate mechanism for doing so.

Consideration of alternatives to licensure focuses on three major areas:

review of existing statutes which may be applied to correct the problem; promulgation of new, less restrictive statutes requiring registration or certification; and examination of non-governmental mechanisms which are or may be used as control devices to improve services.

Review of existing statutes may reveal that authority is already vested in some governmental entity to undertake measures which may alleviate certain problems. Enforcement efforts may bring about compliance with existing codes or standards, thereby protecting public health and safety. Civil and criminal laws against false advertising or deceptive trade practices may be usd to enjoin activities found to be injurious. In short, the answer to the quest for governmental protection of the public's safety may lie in already existing statutes: an imaginative user of the statute may catalyze reform without recourse to additional legislation, or may find that slight modification of current law is all that is necessary.

A second alternative to investigate is that of private efforts to maintain high quality in the provision of services. Often, the most effective method for an occupational group to keep its standards consistently high is by the adoption of a code of ethics which is vigorously enforced. Use of such a code or other "self-policing" mechanism can be an indication that the group is earnest in its efforts to deliver quality service. Furthermore, a license-seeking group which has utilized a self-imposed monitor system presents a more cogent appeal for governmental intrusion into the field: good faith private monitoring is inadequate, and thus the need for more coercive measures is apparent. Peer pressure by practitioners is another mechanism which safeguards public interests. Adoption of formal procedures for imposing standards or informal methods for communicating peer attitudes each are highly persuasive techniques for achieving desired results. Fulfilling peer-developed standards is a strong incentive for providing superior services. Also, private certification of qualified group members can be an efficient manner for apprising the public of which practitioners are more highly qualified. This intra-group identification mechanism utilizes standards for certification which are founded upon practical experience with the delivery of a particular service. Occasionally, private certification is not viewed as an adequate indicator of the competence of the provider: criteria for certification may be so minimal that certification status is meaningless. However, private certification and use of codes of ethics may be methods which require the maintenance of high standards. These mechanisms may be self-serving to the group by limiting entry into the group, but selectiveness and vigorous entry-level criteria also often result

in adequate protection of consumers' health and economic interests. Thus, examination of the adequacy of the certification and ethical precepts of a group to ensure the provision of satisfactory services is essential.

Intermediate governmental steps (short of licensure) which may be taken include official registration or certification of group members. Registration largely involves the creation of a roster of practitioners, possibly in combination with minimum practice standards promulgated by an oversight agency. Entry is not pre-screened by a regulatory board, but practice is controlled so as not to fall below minimum established standards. Alternatively, certification is official recognition of those who meet a pre-determined set of qualifications established by an agency. Non-certified practitioners may be allowed to offer services, but without holding themselves out as being "certified." Certification is an especially appropriate method for allowing unskilled members of the public to identify competent practitioners, while still allowing for the maintenance of a non-monopolistic market for those seeking to offer services. The need for governmental intrusion into the activities of an occupational group most often flows from a recognition that private control devices are impractical or inadequate. The level of intrusion, i.e., whether via registration, certification, or licensure, depends on the perceived harm suffered and extent of official action necessary to reduce this harm. A combination of private controls and intermediate regulation may be sufficient. Only when it is apparent that extensive regulation is necessary will registration or certification be rejected. These two approaches preserve a more openly competitive market by providers; they will be abandoned upon a showing that the minimum controls they impose do not in fact safeguard public interests.

III. The Impact of Proposed Licensure

Upon a determination of the apparent necessity for a licensure statute, a number of factors must be analyzed. What are appropriate requirements for entry into the occupation? How are current in-state or out-of-state practitioners to be treated? How extensive should be the scope of practice provisions and how will they impact on other providers? Should there be time limits on licenses and what provisions should be made for renewal? Who should participate in the regulation of the occupation, and how should the regulatory process be administered? What will be the practical effects of licensure and regulation on the public?

Since licensure is the official granting of an exclusive privilege to engage in (often highly complex and technical) circumscribed activities to a particular group of individuals, statutes must be carefully drafted after review of the above issues. Standards for entry are generally described in statute. A designated regulatory board is left with discretionary authority to promulgate detailed criteria for admission. However, statutory language should clarify that entry restrictions are desired to ensure high quality services, not merely to control the supply of practitioners. Thus, provision for allowing entry by those with, e.g., extensive experience but who lack mandated education, is necessary. In addition, entry by those licensed in states with similar criteria, should be considered. Promulgation of most specific requirements for licensure are best delegated to administrators, while provisions generally allowing for "exceptional" cases must be statutory.

The duration of a license once granted and the requirements for renewal have become the subject of much recent controversy. Whether a practitioner need only pay a fee for renewal or must demonstrate, in some quantifiable manner, continued competence, is a matter which has yet to be resolved. Mandatory continuing education or passage of a qualifying examination for renewal are proposals which have been forwarded, but not yet statutorily adopted, for professionals licensed in New York State. Whatever the ultimate decision for a particular occupational group, the basis should be the rectification of some harm to the public and not a limitation on practitioner numbers.

One significant portion of any licensing statute involves the definition of what activities the licensee may undertake. This scope of practice concern is often the subject of controversy where the occupational group demonstrates competency to perform a function traditionally reserved for another already recognized occupation group. Statutes which fragmentize the delivery of care may result in a proliferation of categories of licensees, each claiming exclusive authority to offer a service. Conversely, delegation of functions to recently trained groups may be impeded by over-broad scope of practice provisions of other groups, resulting in an underutilization of available manpower sources.

In drafting a statute which authorizes an appropriately extensive scope of practice without being overly broad, the legislator often is subjected to divergent opinions of the impact of the proposal on other practitioners. It is crucial to clarify new or revised scope of practice statutes to reflect practitioners' and administrators' perceptions of the most efficient dovetailing of functions in order to improve, rather than disrupt, the overall health care delivery system. Without

accounting for the interests of those already providing services, and the impact on the health care system of authorizing a new, distinct occupational group to provide specific services, new scope of practice provisions may ultimately have a severely deleterious effect on service delivery.

Since licensure intimately involves the state in an occupational group's activities, it is incumbent for the state, via statute, to implement a system of accountability. Agencies with oversight authority must be able to review citizen complaints about licensees and undertake expeditious disciplinary actions. Oversight of a group in disciplinary matters serves a dual purpose: protection of the public in a credible manner, and resolution of disputes in a way which is fair to the licensee. Public credibility with regulatory processes may be served by requiring consumer representation on regulatory boards, helping to ensure that improper practices are dealt with forcefully. Alternatively, the institution of independent administrative appeal procedures which operate according to constitutional principles protect practitioners from arbitrary decisions. These provisions must be included in licensing statutes to guarantee expeditious and effective implementation of the state's oversight function.

Finally, the impact of proposed licensure on consumers must be weighed. Consideration is given to whether the creation of a new group of licensees will increase the costs of services or availability of providers. It may be determined that expected cost increases would outweigh benefits which licensure provides. These concerns may not be resolved in statute: they are weighed and form a part of the ultimate policy decision as to the advisability of licensure.

The continued reluctance to enact more licensure statutes reflects the perception that proposals for licensure often do not withstand an in-depth legislative scrutiny as discussed above. In the New York State Senate, the Senate Education Committee generally is charged with review of proposals for licensure since most licensing provisions are in our Education Law. On January 29, 1980, the Committee formally adopted Resolution II, requiring responses to "18 Essential Questions" regarding proposed licensure statutes. Although it did not formally adopt the "18 Essential Questions," the Senate Helath Committee has utilized its provisions when studying proposals which would be embodied in the New York Public Health Law which does address certain licensure and regulatory measures concerning health care providers. These questions crystallize the matters discussed herein and mandate legislative and interest group analysis consistent with principles recognized as fundamental for a thorough evaluation of a licensure

proposal. It is anticipated that the Legislature will continue to use the "18 Essential Questions" as a basis for future analyses of possible licensure statutes. Copies of Resolution II and the "18 Essential Questions" follow.

RESOLUTION II

Resolved: The Senate Education Committee hereby adopts the "18 ESSENTIAL QUESTIONS" in the form included within the committee agenda of January 29, and shall require responses to such questions to the extent the questions are relevant to legislative bills introduced by any group, organization, or public agency which proposes new or revised licensing statutes or which proposes specifically an expansion or modification of a definition of title or scope of practice, or a requirement to qualify for initial licensure. This Resolution shall be effective for the 1980 legislative session.

18 ESSENTIAL QUESTIONS

1. Has the public been harmed because the occupational group has not been regulated?

   A. To what extent has the public's health, safety, or economic well-being been harmed?

   B. Can the claims of proponents of regulation be documented?

2. Who are the users of services offered?

   A. Are they members of the general public who lack knowledge necessary to evaluate qualifications of those offering services?

   B. Are they institutions or qualified professionals who have the knowledge to evaluate qualifications of those offering services?

3. What is the extent of autonomy of practitioners?

   A. Is there a high degree of independent judgment required of practitioners?

   B. How much skill and experience are required in making these judgments?

   C. Do practitioners customarily work on their own or under supervision?

   D. If supervised, is supervisor covered by regulatory statute?

4. Has the occupational group established a code of ethics?

   A. To what extent has it been accepted and enforced?

5. Has the occupational group established complaint-handling procedures for resolving disputes between practitioners and public?

   A. How effective has this been?

6. Has a non-governmental certification program been established to assist the public in identifying qualified practitioners?

7. Could the use of applicable laws or existing standards solve problems? Please address:

   A. Use of unfair and deceptive trade practices laws.

   B. Use of civil laws such as injunctions, cease and desist orders.

   C. Use of criminal laws such as prohibitions against cheating, false pretenses, deceptive advertising.

   D. Use of existing standards such as construction codes, product safety standards.

8. Would strengthening existing laws or standards deal with the problem?

9. Have alternatives to licensure been considered? Please address:

   A. Use of an existing agency under legislative control.

   B. Regulation of business employer rather than individual practitioner, e.g., licensing restaurants rather than cooks or waiters/waitresses.

   C. Registration of practitioners coupled with minimum standards set by state agency.

   D. Certification of practitioners, thereby restricting use of title to those who have demonstrated competence.

10. Why would licensing be more effective?

11. How will regulation help public identify qualified practitioners?

12. How will regulation assure that practitioners are competent?

   A. What standards are proposed for granting credentials?

   B. Are all standards job related?

   C. How do these standards compare with those of other states?

   D. If standards differ from those of other states, can the difference be justified?

   E. Are there training and experience requirements?

      I. Are these requirements of equal duration when compared with other states?

      II. Does training include supervised field experience? If so, is an additional experience requirement justified?

   F. Are there restrictions on where or how experience may be acquired? Why?

   G. Will alternative routes of entry be recognized?

      I. Will applicants who have not gone through prescribed training/experience be eligible for licensure or certification?

      II. Will licensure or certification in another state automatically allow an individual to be credentialed in this state?

   H. Will applicants for licensure or certification be required to pass an examination?

      I. Does an examination already exist?

      II. Does it meet professional and legal testing standards?

III. If no test exists, who will develop it and how will development cost be met?

I. Is there a "grandfather" clause in licensure?

I. Why is it necessary?

II. Will such practitioners be required to take a test at a later date?

13. What assurance will the public have that the individuals credentialed by the state have maintained their competence?

A. Will license or certificate carry expiration date?

B. Will renewal be based solely on payment of fee?

C. Will renewal require periodic examination, peer review, evidence of continuing education or other procedures for continued competence.

14. What grounds will there be for suspension or revocation of credentials?

15. Will regulation increase costs of goods and services to consumers?

16. Will regulation decrease availability of practitioners?

17. Who is sponsoring the regulatory program?

A. Are members of the public sponsoring regulatory program?

B. What associations, organizations, or other groups in the state represent practitioners?

C. Approximately how many practitioners belong to each group?

D. Which of the above groups are actively involved in sponsoring regulatory programs?

E. Are other groups supporting the effort? If not, why?

18. Why is regulation being sought?

A. Is the occupational group claiming it is prevented from rendering services for which its members are qualified by "scope of practice" statement of another occupation?

I. If so, what efforts have been made to resolve differences?

B. Is the occupational group seeking licensure in order to gain reimbursement under federal-state programs or private insurers, e.g., Medicare or Blue Cross?

C. Is the public seeking greater accountability of the occupational group?

Reference: Occupational Licensing: Questions a Legislator Should Ask. The Council of State Governments: Lexington, Kentucky, 1978.

TECHNICAL COMPETENCIES FOR HEALTH CARE WORKERS OF THE FUTURE

Maureen Van Duser
Crouse-Irwing Memorial Hospital
Syracuse, New York

A Health Care Revolution

The rapid and dramatic evolution of the health care delivery system in the past decade is but a harbinger of the future of this industry. The once unimaginable strides in technology, the proliferation of specialists, an increased life expectency, and an increased public awareness of health with a corresponding emphasis on prevention are all factors which will no doubt change the system in the '80's and '90's well beyond what we recognize today. Your charge to prepare the future employees of this as yet unknown system is indeed a heavy burden. The fragmentation and diversity of the cadre of specialists we see in today's acute care setting will in all probability become something reserved for only a very few. Rather, it is my opinion that the future holds a return to home care or if not that, to the skilled nursing setting. Certainly the general public cannot continue to afford the type of care costing thousands of dollars today, and who knows how much more tomorrow.

Actually, not unlike the industrial revolution of the 1700's, we are facing a similar situation within the health care delivery system. Gone are the fine craftsmen of centuries ago who made one product and produced each individually from start to finish. In order to make that product available to the masses, assembly lines were born. Using the "divide and conquer philosophy" Henry Ford designed automobiles at a cost affordable by most. Somewhere between the cost effective but monotonous specialization of screwing one bolt into one engine, 500 times per day and the all-inclusive skills of the craftsman who produces one cabinet every six months at a cost out of reach of the general population must be found the health care generalist whose skills can meet the needs of most of the population at a cost which can be afforded by most of the population.

The Growth of Long Term Care and Home Care

Allied health personnel may provide the key to allowing the public masses access to health care while holding down costs. To achieve this, one must look well

beyond the traditional health care delivery system. Emphasis must be placed on prevention, health awareness, and the problems of the aging and the dying. The role of the health care generalist in today's system is limited; limited by technology, limited by a complex myriad of governing bodies; limited by a host of licensing and certifying agencies, each often with a vested interest. Until the sometimes redundant and sometimes conflicting regulations are streamlined, it is difficult, if not impossible to address the competencies acute care facilities would require of the allied health professional. Each job, indeed each task today, required a professional who carries a license, registration, or certificate. All of this, of course, has contributed to the rapid escalation of health care costs. Just by way of example, the role of a Nursing Assistant in the acute care setting has diminished in the past ten years. This group, which once formed the core of workers providing hands-on care is rapidly being replaced by Licensed Practical Nurses and Registered Professional Nurses. This increase in higher skilled workers has come about because it is no longer possible to train Nursing Assistants to render the technical level of care required in today's acute care setting. Naturally, the by-product of using more highly skilled personnel has been a geometric increase in costs.

This subject would not be complete without mention of the current shortage of Registered Professional Nurses and its impact upon the allied health professions. This is not the forum for debting whether or not a shortage truly exists, nor, if a shortage does exist, is it the place to review what brought the situation upon us. Rather, it is important to be aware that if this situation worsens, health care facilities will be forced to explore alternatives to staffing its acute and long term care beds. While the feeling among providers is still that much of the complex technology and procedures of today require the skills of Registered Nurses, it is entirely possible hospitals and long term care facilities may have to place greater emphasis on roles of both the Licensed Practical Nurse and Nursing Assistant. However, the signs still point to a more rapid growth in other segments of the health care delivery system. Given this situation, it may be more productive to focus on those services which will lessen the burden of health care delivery as it exists today in the acute care setting.

Concurrent with the reduced need for Nursing Assistants in an acute care facility has been a proportionate increase in a need for this worker in skilled nursing facilities, long term care facilities and last, but probably most importantly in the home. Thus, the Nursing Assistant of days gone is evolving into the

Geriatric Technician and the Home Health Technician. Certainly, ever increasing life expectencies and the growing emphasis on prevention should enhance the employment opportunities for these workers. Another arena due to proliferate is that of health maintenance organizations. Here is an area that will likewise not require the complex technical skills associated with hospitals, but where certainly a need exists for patient support personnel and/or direct patient care personnel.

Laboratory Skills Should Be Intergrated

The laboratory based occupations which is among the subjects you are addressing at this meeting might best be incorporated into one of the other two areas. The reason I suggest this is that until credentialing agencies alter some of their requirements and regulations, there is little that can be accomplished in this area. Regulations mandate various registrations and licenses before an individual may perform certain procedures. Excluding clerical personnel, today there are but two laboratory occupations that do not require two or more years of preparation beyond high school. These are: Histology Technicians and Phlebotomists. It is my understanding that it is only a matter of time before this changes as it relates to Histology Technicians. Thus, among a dozen or so laboratory occupations, there remains only the Phlebotomist for which health educators, outside the collegiate setting, or providers can train persons. The foregoing is not intended to minimize the role of the Phlebotomist. Rather with the increased need for long term beds and a return to home health care, it is important to incorporate this skill into the training of both Geriatric and Home Health Technicians. Doing so would alleviate the need for individuals to travel to a hospital simply to have a blood sample drawn. The point of this somewhat convoluted discussion is simply that until there is a change in posture among the regulatory agencies for acute care facilities, there is little need to develop training programs specifically and solely for laboratory based occupations because acute care facilities will not have employment opportunities for such individuals. Given a change in this philosophy in the next decade, that may well alter the employment needs of and opportunities in laboratories. However, if the current trend continues, the committee might be better advised to consider incorporating certain basic laboratory related skills into the educational process of the Geriatric Technician, Home Health Technician, Emergency Medical Technician, and/or Clinic Technician.

Patient Support Services

The remaining area in today's discussion is that of "patient support services." This component of the allied health system has likewise seen many changes in the past decade and will no doubt undergo even more in its evolution. It almost goes without saying that the advent of computer technology has had a profound impact on the health care delivery system. With the proliferation of mini and micro computers comes an increase in the demand for technical data processing specialists. While new systems have reduced the role of Keypunchers, the need for CRT (Cathode-Ray Tube) Operators, Wored Processors, Computer Operators, Programmers, and Systems Analysts has continued to rise. As health care, a relative late comer to the Data Processing World, has come to recoginze the value of computers both in the areas of direct patient services and patient support services, we have to struggle to educate the Data Processing experts on that which is unique to health care. Specifically, computer experts have heretofore been lacking in the basics of medical terminology, the patient as a human being who does not always fit into their very neat, very black and white "X or Y" categories; the twenty-four hour a day, seven day per week cycle of health care and the ever present threat of crisis. This is certainly not to imply that the growth of computer technology has all been a one-sided educational process. Health care facilities, who are notorious for their traditionalism, have had to learn to adapt to certain limitations and parameters imposed by the computer. However, from a selfish perspective if the Data Processing experts came into the health care industry with a working knowledge of what it is all about, this would not only enhnace the process and their credability, but it would also and more importantly increase their productivity by reducing their basic orientation.

Another area alluded to a number of times but not specifically addressed is that of equipment technology, which we call biomedical technology. The development of advanced, sophisticated life support systems has a built in need for equipment repair and maintenance. Heretofore, hospitals have been forced to employ persons gifted with an understanding of electronics and provided them with specific training in the nuances of the biomedical machinery. Certainly, as with the computer experts, if such persons came to health care facilities with a basic understanding of what the patient is all about, along with their trade skills, it could only serve to enhance this support system.

An examination of some of the "old guard" support systems shows room for great i npact from educational facilities. The rapid growth in technology without a corresponding response from education has left health care providers with the need to train its own. This, of necessity has often resulted in haphazard catch as catch can, on the job training. I refer to such areas as Central Sterile Supply, Environmental Services, Nutritional Services and Maintenance; areas which on an average comprise some 20% to 25% of the workforce. In such settings, subjects like sterile technique, instrumentation, isolation technique, patients' rights, and patient privacy, to name a few are left to the expertise of individual departmental managers. Certainly, it could only be considered a plus for an employment office to find an applicant who already has an awareness and knowledge of these subjects.

A Core of Competencies

Thus, to return to the subject at hand, there are certain subjects that may provide a core of competencies for allied health care workers, whether they are employed in acute care settings, long term facilities, health maintenance organizations, and/or in individual homes and whether they are employed in direct patient care or patient support areas. Foremost among these, for any person is some understanding of the patient as a human being, with all of the virtues and foibles attached thereto. Every person who chooses any aspect of health care should be imbued with a real sense of the patient's bill of rights, patient's privacy and the patient's right and need to be treated with dignity and compassion. No matter how far removed any one of us might be from the patient, all of us in any health care agency are there for the ultimate good of the patient. Thus, it is an important for the Maintenance Worker or the Biomedical Technician as it is for the Registered Nurse to not only be familiar with, but also and more importantly to put into practice the Patient's Bill of Rights.

Still another realtiy that needs to be addressed is the fact that health care is a 24 hour, 7 day a week business, regardless of the profession an individual chooses. Health care providers have oten criticized educators for not preparing candidates for some of the harsher realities of health care work. Chief among these has been the fact that student clinical experiences all too often occur on the day shift on a Monday through Friday basis. I do not wish to be drawn into that self-righteous appraoch both educator and provider alike have all too often taken, each blaming the other for the many problems besetting the industry today. Rather, it is

important in a forum such as this to lay aside long established prejudices and decide where we can go from here. For any of the disciplines referred to above and indeed for all professions in any aspect of health care--the acute setting, the long term care setting, the home, and the clinic, it is essential that any person being trained for any of these professions experience the reality of patient problems on evenings, nights, and weekends. Thus, in considering observational and/or practical experience for any students be they clerical, service, technical, or professional candidates, I urge you to consider scheduling some of these experiences in a time frame other than Monday through Friday 8:00 a.m. to 4:00 p.m.

Still another area of skills necessary or common to all professions is a working knowleged of medical terminology and basic anatomy and physiology. Granted, it is not as important for a Biomedical Technician to know the skeletal system as it is for a Home Helath Technician. However, such knowledge could only enhance their overall productivity and improve their integration into the total health care system. Just like the assembly line process, the health care delivery system in an institution or in the home can only be effective when all parts of the team mesh into a cohesive whole. For far too long we the providers have been guilty of a certain caste system that has prohibited us from sharing "that which a nurse is responsible for" with those employees "who do not need to know nor understand." The lack of sharing or the type casting of certain workers can only impede the efficient operation of the whole. In examining the mosaic of wokers who comprise the health care team, we, educators and providers alike must shed some of our provincialism and recognize that there is indeed a certain body of knowledge and understanding common to all of these professions. The sooner all of us achieve a more global perspective of this, the better we will all be--an approach that can only result in an improvement in the whole delivery system.

In following this analogy, it is likewise important that those who are responsible for "hands on care" have a basic knowledge of the technology of the equipment. If the Maintenance Worker is ever to appreciate the needs of the patient and the role of the professional nurse; then so, too, should the nurse and/or the technician have a basic understanding of equipment and its use. I am certainly not advocating that there be an ability for a complete exchange of skills among these many, many technical specialists, but I believe that it is only logical that for all professions to understand and appreciate one another, there must be some understanding of the duties and responsibilities on another has. By way of example,

both the nursing professions and laboratory professions are well on their way to heavy computerization. Yet, I am unaware of any nursing school, at either the Registered Nurse (associate, diploma, or baccalaureate) or the Licensed Practical Nurse level, nor any laboratory technician or technologist program that includes in its curriculum some course of study on data processing. How then are nurses and laboratory technicians/technologists to use such systems unless the employer provides the orientation and training? How can these two key departments communicate and/or interact effectively with Data Processing unless each has a basic understanding of the needs and services of the other?

The terms communicate and interact bring to the fore still another essential area. In outlining basic competencies, not to be overlooked is the need for sound verbal and written communications skills. A health care system can only deliver when all components effectively interact with one another. Success in this area is contingent upon mastery of basic oral and written communications skills. Even more important than interaction within and among departments is the effective interaction with patients around whom this whole system revolves. Any and every employee at any and every level of the system must become proficient in basic communications skills. A part of the communication process should include some teaching about the general hierarchy of health care as this relates to regulations, financing, and the law. Admittedly, all three of these areas are extremely complex and each provides sufficient material for a course unto itself. However, a basic understanding of health care costs may serve to assist cost containment programs. Certainly, a major part of the cost factor has been the area of regulation. Health care in New York State is regulated by some 164 agencies, some of which overlap and contradict. Nevertheless, every employee is entitled to know the "whys" of the system. In the delivery of safe patient care either directly or as a part of one of the many support systems all employees should be familiar with certain basic regulations.

Employees within the system today hear regularly about the need for cost containment. However, I would venture to say that few are aware of the many financial pressures on health care providers. At some point students should receive some instruction in the whole scheme of reimbursement. Even a limited understanding of the many factors contributing to the complex financial system would enhance their appreciation of cost containment effortss. Certainly, it goes without sying that no cost containment program will ever be effective until all members of the system participate and participate with understanding in such efforts.

Every practitioner needs to be made aware of the legal aspects of the system. Granted, malpractice liabilities are far greater for the nurse than the Environmental Services Technician, but all need to be made aware of minimum liabilities. If a cardiac monitor malfunctions after having been repaired by a Biomedical Technician, who is liable? If a patient develops an infection following surgery, where is the liability? Such examples can be cited at length. Certainly, every employer/provider has a liability, but not to be overlooked is the role and the rights of the employee involved in any such situation. Therefore, the law and the health care practitioner is a subject which should be addressed by any program training people for employment in the system.

Still another area everyone in the system needs to become proficient is the basics of cardiopulmonary resuscitation and the Heimlich maneuver. While not every employee needs to become "coronary care certified," every employee should be proficient in basic resuscitation procedures. There are a number of agencies offering CPR certification. Any educational facility preparing persons for careers in health care should include both CPR and the Heimlich maneuver instruction in its curriculu. Concurrent with this, it is advisable to consider including some instruction about monitoring and the techniques of electrocardiograms. Both Monitor Technicians and ECG Technicians are an integral part of the team in an acute care setting. Both are trained in on-the-job programs. Even for those persons who do not choose these professions a basic understanding of these pieces of equipment would enhance their ability to function as Geriatric Technicians, Home Health Technicians or Maintenance Workers.

The mention of such positions as Monitor Technicians and ECG Technician opens the whole technical Pandora's box. Many health care facilities have a host of technical specialists in one, two, and three person departments, depending upon the size of the facility. Most train their own staff in on-the-job programs. Certainly, specialized training programs for any one of these is not a wise route to choose because employment opportunities are limited. However, a proficiency in the areas cited would result in a reduction of the length of certain on the job training programs and, ultimately increase overall productivity. In the acute care setting, these technical specialists positions include, but are not limited to:

Electroencephalography Technician
Surgical Technician
Biomedical Technician
Electrocardiograph Technician

Echocardiography Technician
Central Sterile Technician
Respiratory Therapy Equipment Technician
Phlebotomists

In smaller hospitals, rural hospitals, long term care facilities, clinics and in private homes, where a full time person or persons in any one of these positions cannot be justified; the need for a working knowledge of these professions or the developoment of a multicategorical technician is certainly within the realm of possibility. Cetrain radiology equipment is now portable and Registered Radiologic Technologists travel to institutions and to homes for many procedures. If this is done today, it is conceivable such persons could be trained to handle some of these other technical functions? This question brings us back to the development of generalists particularly in the areas of geriatric care, home health care, and preventive medical clinics. In order to make health care; preventive, diagnostic, restorative or rehabilitative; available to the masses on a cost-effective basis, we must look beyond the traditional acute care setting of today. Like Henry Ford, we must fragment the system and move it into other settings. Acute care hospitals will be reserved only for the few most acutely ill. The remainder of the population will be served by generalist workers in long term facilities, clinics or their homes. Certainly hospitals will continue to need and to employ technical specialists. However, it is my opinion that the greater need and indeed the greater opportunities will occur in the next two decades in the aforementioned areas. With both a growing older population and a heightened awareness of health care needs among a younger, more sophisticated, better educated population, health maintenance organizations and home care are the way of the future. We, both educators and providers, must prepare ourselves for this. A core of clinical competencies plus clinical experience in the institutions today, should prepare people to join the health care delivery team and make a significant contribution to the system.

In summary, there are many technical specialist positions in health care today for which providers offer on-the-job training. In addition, the future holds that there will be a growth in long term care beds, clinics, and an increase in home care. There are certain skills that cross all of these settings and could be incorporated into any general curriculum. All health care workers need to have a working knowledge of and/or proficiency in the following:

1. Patient as a Human Being
2. Medical Terminology
3. Basic Anatomy and Physiology
4. Major Equipment - Use and Minor Repairs
5. Impact of Data Processing
6. Verbal and Written Communications Skills
7. Regulations and Financing
8. Legal Aspects of Health Care Delivery
9. Basic Life Support Systems - CPR
10. Sterile Technique and Isolation Technique

The need to incorporate the didactic process with a realistic practicum is essential. The next two decades promise to be a tumultuous challenge for both educators and providers. Unless the two join together to meet these challenges, the many problems facing health care today will not be resolved... I applaud your efforts to do so.

TECHNICAL COMPETENCY FOR ENTRY LEVEL INTO MEDICAL FIELD AT AIDE-TECHNICIAN LEVEL

Richard Joseph Tindall
Syracuse Brace Company, Inc.

The question of what technical competencies could or should be included in a program of training for entry level medical aide/technician positions forms the basis for a fair amount of controversy. The point of contention seems to be whether specific skills or broad-based "generic" skills are more desirable in preparing high school graduates for these entry level positions. Speaking as an employer of orthotic technicians; as well as one who works with physical therapy aides, nursing aides, and home health care/nursing home aides; I will gladly share whatever insight I have on this topic.

The way I will approach this matter is by looking at different skill areas, such as communications, physical training, technical skills and adaptability; and then provide a general overview for future thought. Be forewarned that my concern over the speed of technial change in this area causes me to stress the importance of adaptability and broad preparation rather than the training of specific skills.

Communication skills are probably the most crucial in this area; since a broad range of technical information, displayed on charts, diagrams, and handwritten notes, is being transmitted from highly specialized physicians through various persons to a largely uninformed patient. At the aide level, close personal contact with the patient often requires that the aide interpret the data for the patient; and/or make reports about the patient's progress back to the upper levels of the systems. Accuracy and objectivity, tempered with compassion, helps keep this line of communication active. For the orthotic/prosthetic technician, ability to observe the patient and make appropriate adjustments or report to the practitioner or even the physician about the patient's progress is equally important.

Physical training is an area I feel is grossly neglected in the present educational system. The potential for back injury could be significantly reduced by training individuals in certain basic principles of body mechanics and simple physics. As a fitter of garments for patients with low back problems, I see an inordinate number of nursing aide/patient care type individuals who, while extending themselves over a patient in a vulnerable postiion, are injured when the patient jerks his head, shifts his weight, or in some way moves unexpectedly. Creating low back torque when the back is in extension and under stress is a condition of high risk and anyone endeavoring to work in this field should be made aware of the dangers.

Technical skills required are perhaps the easiest to quantitate; but again, a broad base is preferable. For orthotic and prosthetic technicians, background in woodworking, sheet metal, general shop skills could all be put to good use; since custom orthotic problems rarely come in convenient, pre-measured shapes. Often, the technician must create the tools needed to complete the job. For example, turning a long bolt into a rivet setter to use on boot work; or a piece of one-inch pipe into a rivet remover base; or using scrap pipe inside a positive cast to make a handle and more scrap to make a reusable holder for the casts--the ability to adapt what one has to accomplish one's task is highly desirable.

Obviously, my last skill area--generic skills--is one I place a premium on. Adaptability, creativity, flexibility are all traits any prospective employer should be looking for; but can these things be taught? Maybe--maybe not; but they certainly can be encouraged by educators interested in the total worth of the pupil and not the sum of his or her individual skills. Developing good work habits and research techniques, along with creating situations which develop problem solving techniques are but two ways of working on these generic skills.

Technical competencies for entry level health care aide-type positions should be developed to help better train students who wish to enter this highly competitive field. However, care should be taken to avoid training any individual to use skills required for a specific job and not develop the capability in that student to change as the job or the system changes. In the ever-changing field of medicine, that would be grossly short-sighted.

NEW PRODUCT DEVELOPMENT: A PERSPECTIVE ON USER TRAINING

M. Wardle and
R. Drummond

Hospital Applied Research
Amerian Hospital Supply Corporation

Our organization is primarily concerned with the research and development (R&D) of new medical devices. An integral part of our R&D effort is to consider how the user will interpret our operational instructions for a proposed product. While it is the intent of our instructions to make it as obvious as possible how best to use the product, it is our belief that the most beneficial use accrues from the user having a basic orientation to the medical environment for which the product is intended. Technical competency in the following areas would facilitate the use of medical devices we develop: anatomy and physiology; patient safety, medical terminology, and function of present day products.

Basic concepts of anatomy and physiology are considered the groundwork for health education. Medical device R&D is directed towards developing products that will complement the body's composition and function. These products can only be utilized effectively by an operator with a good understanding of anatomy and physiology. This knowledge is best obtained through schooling, as clinical practice alone often does not give good insight into how the body functions.

Throughout the course of health education, patient safety should be stressed. The patient's well being is of paramount importance in any given situation. The medical devices we develop must innately afford a high degree of patient safety. However, patient safety can still be compromised by improper device use accruing from inadequate basic training of patient care personnel.

Medical terminology provides the basis for communication among health care professionals. Quality health care greatly depends on one's ability to define and comprehend medical terms. Future health promoters should be well-versed in this structured vocabulary. Most medical products contain direction inserts. These directions are generally geared towards a knowledgeable professional of the health care industry. Ability to perform the required instructions for a device is often dependent upon one's ability to comprehend basic medical terminology.

The mechanical procedures for the use of medical devices are extremely varied; however, education aimed at basic principles will facilitate their use. For example, elementary physics concepts may enhnace the user's ability to safely

employ the equipment. Of course, the ability to function with skill is derived from actual practice. Although in-service demonstrations are frequently provided as a new product is put on the market, these short classes are only sufficient as refresher courses and will not provide enough knowledge to the untrained. Future medical products will by and large be more advanced technological forms of products available today. Thus, a basic knowledge of how to handle currently available products, obtained through education, will allow professionals to readily use more advanced products as they are developed.

These areas of core competency should be envisioned as a whole. Health care professionals must continuously combine this basic knowledge to function effectively. Although auxilliary personnel may not initiate the use of certain medical devices, they frequently come into contact with them and hence would benefit from training in these areas. Three specific categories of direct patient care that exemplify these core competencies are: a) wound care, b) urinary catheterization, and c) infusion therapy. Our group is continually directing its efforts toward new product development in these treatment modalities. In order to expand on the discussion of basic training required for direct patient care personel a typical product in each of these categories will be discussed.

The wound care area is one that just about every health care professional comes into contact with on a daily basis. Figure 1 shows a photograph of a relatively new type of wound dressing product. Figure 2 shows the instructions for the utilization of this product. A health care professional coming into contact with such a product should have an appreciation for the anatomical and physiological function of a wound dressing; i.e., that it serves to act as a "temporary skin" by protecting the body from outside contamination and helping it maintain fluid balance. This product requires an understanding of the terms "aseptic technique" and "infection control." The intent of the product is in large measure to safeguard the patient from infection. A basic understanding of this product concept will improve patient care. Whether the health care professional is involved in the actual initiation of the use of this device or not, he or she should be able to adequately understand the manufacturer's directions for use and the intent of the product. As can be seen from the instructions, direction is given only as to how one removes the device from the package and then manipulates it to place it on the skin. Therefore, the instructions as they stand alone do not explain the requirement for preparation of the wound by cleansing, etc., prior to placement of the dressing on the wound. An understanding of the intent of a product does much to

insure better direct patient care by giving personnel the breadth of knowledge that sometimes may not appear on user instructions for a product.

Another medical device commonly encountered in direct patient care is the urinary drainage system as shown in Figure 3. The instructions for the use of this device (Figure 4) include a diagram showing the anatomical relationship of the device to the patient. Again, to best understand the instructions for use of this device it is important for personnel to relate not only to the terminology expressed in the directions, but also to be able to extrapolate these to the overall intent of the product. While many direct patient care personnel may not be involved in the actual set-up of such a device, they will be handling patients that have indwelling catheters and attached drainage bags; therefore, an appreciation of the mechanics for set-up and care of this product is in the best interest of patient care.

A last example of a medical device commonly dealt with is shown in Figure 5. This is an infusion therapy set-up for the administration of intravenous solutions. As can be seen, the instructions (Figure 6) are quite detailed and require a significant level of education in all of the core competencies mentioned above. Since this particular product is set-up either by a physician or a highly trained nursing team, it is likely that most personnel in the hospital will not be involved in the initial deployment of the device. However, it is quite common for hospital personnel to come into contact with patients undergoing this type of therapy, and hence an understanding of the device and its requirements in terms of anatomy and physiology, patient safety, medical terminology and mechanics enhances the quality of patient care they can administer.

All three of these example medical devices are commonly encountered in the hospital environment, and those involved in direct patient care will very often be required to handle patients utilizing them. It is not likely that personnel will be able to relate to these devices without training in the core competencies mentioned. Without this basic orientation it is conceivable that direct care personnel could compromise the safety and efficacy of a device.

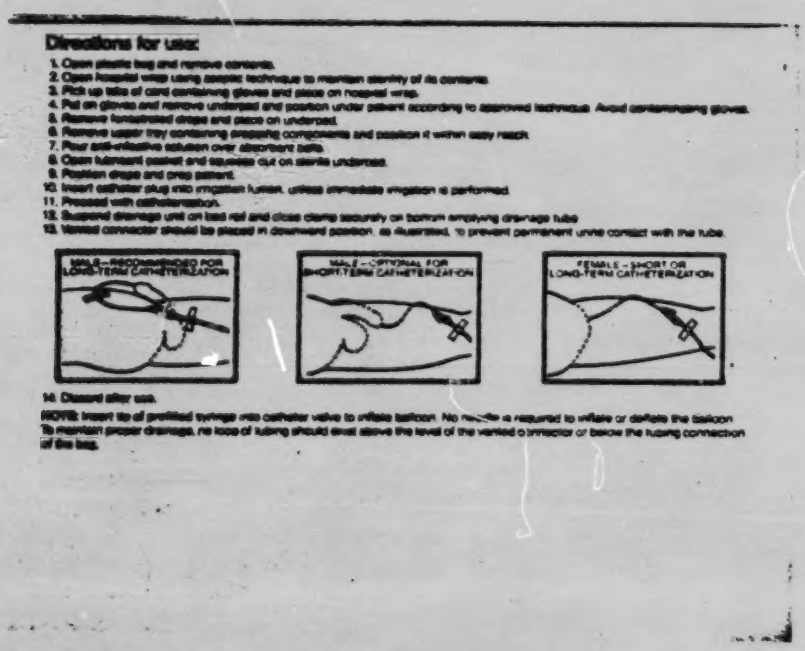
In summary, I have identified four basic core competency areas that will aid direct patient care personnel in dealing with medical devices. In addition, such training will better prepare them to handle new devices introduced into the hospital environment. Health education directed towards integrating these fundamentals will educate direct care patient personnel to a level where the highest quality of patient care can be insured.

FIGURE 1. Polymeric film wound dressing material

Op-Site
adhesive drape
See base for application instructions
size: SMALL 15cm x 28cm (5⅞in x 11in)
Reorder no. 64986
instructions for use Op-site must be applied to dry skin

FIGURE 2. Instructions for use of a polymeric film wound dressing material

FIGURE 3. Urinary drainage system kit



Directions for use:

1. Open plastic bag and remove contents.
2. Open hospital wrap using aseptic technique to maintain sterility of its contents.
3. Pick up tube of cord containing gloves and place on hospital wrap.
4. Put on gloves and remove underpad and position under patient according to approved technique. Avoid contaminating gloves.
5. Remove forequivered drape and place on underpad.
6. Remove upper tray containing prepping components and position it within easy reach.
7. Pour anti-infective solution over appointed parts.
8. Open lubricant packet and squeeze out on sterile underpad.
9. Position drape and prep patient.
10. Insert catheter plug into irrigation funnel, unless immediate irrigation is performed.
11. Proceed with catheterization.
12. Suspend drainage unit on bed rail and close clamp securely on bottom emptying drainage tube.
13. Vented connector should be placed in downward position, as illustrated, to prevent permanent urine contact with the tube.

MALE—RECOMMENDED FOR LONG-TERM CATHETERIZATION
MALE—OPTIONAL FOR SHORT-TERM CATHETERIZATION
FEMALE—SHORT OR LONG-TERM CATHETERIZATION

14. Discard after use.

NOTE: Insert tip of prefilled syringe into catheter valve to inflate balloon. No needle is required to inflate or deflate the balloon. To maintain proper drainage, no loops of tubing should exist above the level of the vented connector or below the tubing connection of the bag.

FIGURE 4. Instructions for use of a urinary drainage system

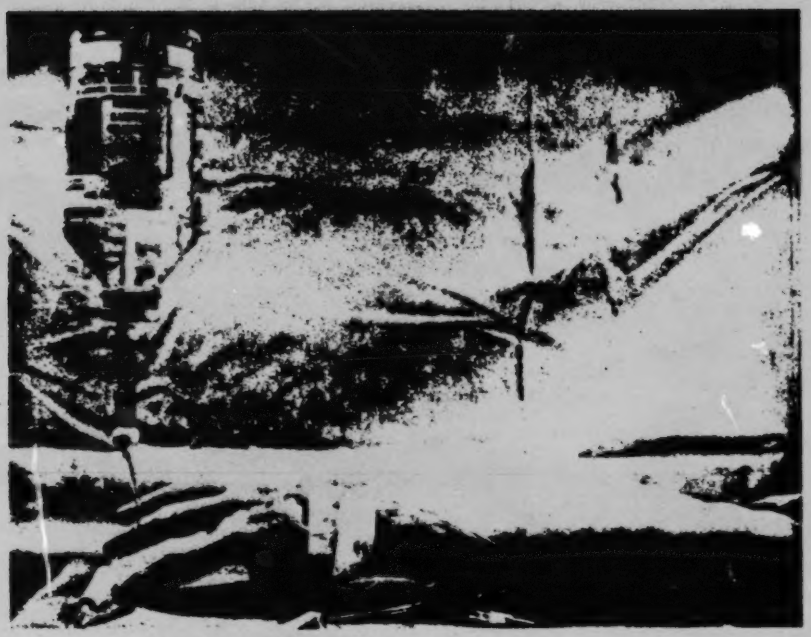


FIGURE 5. Intravenous solution administration set-up

Disposable

ADDitiV™ SET

For intravenous solution administration

with injection sites 5" and 29" above needle adapter (no flashtube)

CAUTION: Only the fluid path and the area under protective coverings of set are sterile and nonpyrogenic.

DIRECTIONS FOR USE

An Aseptic Technique Is Required – Identify All Parts Before Assembly

This set can be used in conjunction with a Solution Series Administration Set, V 1902, for additive administration from a secondary bottle of any size, followed automatically by delivery from the primary bottle after the secondary bottle has emptied. It can also be used for regular administration.

FOR REGULAR ADMINISTRATION:

1. Before removing outer closure and tamper disk, invert container to moisten stopper.
2. Close clamp.
3. Squeeze drip chamber and insert spike through large hole in stopper marked "outlet." Release chamber and suspend container. Squeezing chamber prevents fluid loss from air tube when container is suspended.
4. Squeeze and release drip chamber until it is about half full of solution.
5. Remove protector from needle adapter. Attach sterile, nonpyrogenic needle with bevel aligned with bevel indicator on needle adapter. Open clamp and fill tubing and needle with solution. INVERT AND TAP CHECK VALVE and injection sites to clear air. Close clamp. Make venipuncture. Open clamp and regulate rate of infusion.

NOTE: Top injection site should be reserved for series set connection during additive administration. Retain hook for use during additive administration.

FIGURE 6. Instructions for intravenous solution administration

SUPPORT SERVICES AND HEALTH OCCUPATIONS EDUCATION: AN APPRAISAL FOR THE 1980's AND BEYOND

Janet Zhun Nassif

For any of you who may be unfamiliar with the term "support services," in the jargon of health delivery, support services generally refer to those non-patient departments that are vital for the daily operation of in-patient facilities. These include such areas as security, mailroom, central supply, maintenance, laundry and food service. Without the backup of behind-the-scenes personnel in support services, patient care would come to a virtual standstill. Consider the problems of rendering quality patient care without adequate support aid in a large hospital such as New York City's Columbia Presbyterian. Each day direct care must be provided to over 1200 in-patients. In addition, a supply of close to a million items must be maintained and immediately available when needed. Thousands of visitors must be monitored, over ten tons of laundry must be washed, three million square feet of floor must be cleaned, and 7,000 meals must be served--each day. In this one institution alone the budgets for these departments total a staggering amount--approximately $15 million annually.

Clearly support departments both in terms of services provided and dollars expended are an essential component of the health care system. It therefore seems entirely reasonable to include a patient support track in health occupations education. After all, in addition to the facts already cited, many students do not desire or are not temperamentally suited to working with patients directly or they may not be oriented toward biomedical instrumentation. Support services appear a viable alternative.

However, before you consider the specific technical competencies that might be infused into a health occupations curriculum for support services, I hope you will consider a more basic question: namely, is a patient support service track appropriate for health occupations education in the 1990's? Before deciding, there is additional information and issues surrounding support services that I would like to share with you.

First, these jobs for the most part are not generic to the health care field. Indeed most of the support systems mentioned earlier and the personnel they employ have counterparts in other settings. Plant maintenance crews in hospitals like elsewhere are skilled craftsworkers who are card-carrying union plumbers, welders, electricians, etc. They merely work in a health care setting. Business

must maintain security and supply systems, operate mailrooms and run employee food services. Hotels are perhaps the best example. In order to function efficiently and serve its customers satisfactorily they require the same support services as today's modern hospital.

It may be argued, however, that hospitals are different. After all, hospitals serve patients; hotels, customers. But is there really such a critical difference?

The attitude that consumers somehow lose their basic "customer" rights when they become patients is being laid fast to rest. Increasingly, hospitals and other health institutions are becoming concerned with patients' satisfaction. Much of what is coined as "patient sensitivity" is really customer relations; just listening attentively to our health customers and giving their needs and requests priority over a heretofore rigid system. While in the health system, the customer is not yet always right, major change is evident. Birthing rooms are on the rise in traditional hospital settings. Pediatric patients may have their parents room in. Patients even have their own Bill of Rights. Hospitals have found that increased patient satisfaction means more filled hospital beds and fewer malpractice suits. In short, a less costly, more efficient operation.

Support service personnel, like all health workers, must be aware and considerate of patient needs. But, in general practice, they have minimal or no contact with patients and their family. Certainly, patient sensitivity should be included in the vocational training of all the work in health services. But does this need alone justify the development of a separate support track in health occupations education? Or would it be more appropriate to include this as part of a health orientation for those students in other non-health vocational programs who may be opting for health employment?

A second fact to consider before implementing a support track is that most employers already provide entry level inservice training in these areas. A training survey of all New York City hospitals conducted by the United Hospital Fund found most employers provide initial training for almost all support areas as well as patient care, particularly nurses' aides. While the idea of a vocationally-trained and job-ready support person has obvious employer advantages, in fact, this concept is difficult to implement. Most patient facilities have developed their own specific procedures for meeting basic health care standards. Frequently, even entry level workers with previous job experience will undergo inservice training when hired by a new institution. Why? For the simple reason this minimizes the on-the-job errors that often occur when supervisors assume an employee is job-

ready by virtue of previous training or experience. This is particularly true for entry level positions involving direct patient care when mistakes may jeopardize patient safety. The trend for employer-based entry level inservice training has not decreased over the past decade and is not likely to in the future. Without other means to insure job competency, such as basic certification, employers will continue to train entry level workers.

The notable exception to this rule-of-thumb, however, may be in the more geographically isolated areas where both employers and vocational programs are few. Therefore, both groups can work closely together to tailor vocational training to meet a particular institution's needs.

Finally, and most importantly, before developing this support service track you should consider the reality of support service jobs. While from an operational standpoint these jobs are critical, from a worker's standpoint they are essentially deadend. Let me share with you some of the daily work tasks.

Assistant Stock Handler

- Receives, stores and distributes supplies and equipment.
- Packs, unpacks, counts, weighs, and measures materials, supplies and equipment.
- Checks materials received against invoices.
- Picks supplies from shelves to fill requisitions, lifting and carrying supplies when necessary.

Laundry Worker

- Sorts, weighs, and counts clean and soiled laundry items.
- Marks laundry items by hand or machine.
- Prepares work for, feeds, receives, and folds linen at the flat-work ironer.
- Folds, counts, and packs clothes and laundry for delivery to wards.

Dietary Aide

- Assembles prepared food on trays for patients on regular or modified diets according to menu cards or special diet lists.
- Delivers trays and carts to patients and collects soiled trays for return to kitchen area and cleaning.
- Collects and places garbage and trash in designated containers.
- Reconstitutes hot foods in microwave ovens.
- Washes dishes and cleans equipment in work area.

Housekeeping Aide

- Sweeps, dusts and mops wards, rooms, offices, corridors, utility and bathrooms, including furniture and medical equipment.
- Cleans porter's closet, storage, supply and linen rooms and bags soiled linen.

- o Is responsible for floor maintenance, stripping, waxing and polishing.
- o Maintains control over tools and equipment.
- o Empties wastepaper baskets, trash, and garbage cans.

As might be evident from these job descriptions which come from New York City's Health and Hospitals Corporation, these jobs require little education and training. While specific hiring standards vary by employer, in general, most entry level support positions require an eighth-grade education or less and minimal skills that can be learned in just a few weeks of on-the-job training. The jobs are deadend. Upward mobility via recognized career ladders is non-existent for most support personnel. Salary increases may be awarded, but real promotional opportunities generally require higher education and basic managerial and supervisory skills. Looking ahead to the 1990's, this need for advanced education in all health areas will grow--not decrease--except for the most menial positions. Moreover, the increased technology and mechanization in support services delivery in the 1990's promise to replace or reduce unskilled workers, thereby minimizing labor costs. For example, a closed-cirucit surveillance system can be installed in a large hospital for a one-time cost of about $200,000. It can provide security coverage roughly equivalent to 20 guards. If you were the administrator what would you do? Hire the guards or install the system?

Let's return now to that basic question asked earlier: Is a patient support track appropriate for health occupations education, given that the jobs are not generic to health, employers already provide training, and most jobs are deadend?

I leave the answer to you. For my part I would argue that support service training belongs in other vocational programs. However, I do see an important gap in health occupations education, and I would like to pose a different option for your consideration.

Students who are seeking a different health care experience--those who do not choose to work directly "hands on" with patients or who are not technologically-oriented should have the opportunity of pursuing a health administration and education track. A current demand for workers exists in these areas and will undoubtedly increase in the 1990's and beyond. All signals point in this direction:

- o The emphasis on cost containment, budget controls and professional health management.
- o The growing mass of information with which health personnel must deal.
- o The thrust for greater consumer participation in health care and the new focus on prevention.

Students with broad-based skills in this track can function in varied positions within multiple health settings. Administratively, they may work as ward clerks on patient floors, or as aides in medical records, admissions, personnel, finance or other departments. Health insurers, health systems agencies, and regulatory organizations are just a sample of non-institutional health employers who need personnel qualified in this area.

Looking at the "education side" of this track, workers are needed who can participate in patient and consumer health education. The dietary "tray or line" worker is easily replaced. What is needed are dietary aides who understand nutrition principles who can also talk to patients, obtain routine diet histories, make basic diet modifications, and explain to patients what diet changes are needed and why. Hospitals are changing their focus from providing sick care to a more comprehensive aproach that emphasizes health promotion and disease prevention. A recent American Hospital Association survey found that over 1200 hospitals were currently providing health promotion programs to local businesses. Many businesses and industries across the country are establishing preventive programs for employees and their families. So too are community organizations such as Y's, Boy's Clubs, and senior citizens day care centers. The final report of the New York State Commission on Health Education and Illness Prevention has called for the development of incentives for the use of community health workers and neighborhood health aides in health education and prevention programs across New York State. These programs need mental health and health education aides who can work with people at the grassroots level. They must be able to touch all preventive lifestyle bases--not just stress management, but exercise and fitness, nutrition, alcohol and drug use.

Outside of job demand, an administrative and education track has another important advantage--it has job mobility. Career ladders do exist. Entry level workers can build on their knowledge and experience base and with more education advance. The dietary aide can become a dietetic assistant, technician, or dietician. The ward clerk can become a unit manager and health services administrator. A department administrative aide can become a first-line supervisor. A medical records clerk can rise to the ranks of technician or administrator. The educational aide can go on to become a health education assistant and health educator.

Many of the competencies required for this track have already been identified in your occupational education and health occupations core. First and

foremost there is a need for basic literacy and information processing of which computer literacy must be considered essential. Employability skills--not just the elements required to keep the job, but those necessary for getting the job in the first place: how to fill out applications, developing a basic resume, and how to identify potential employers. (This means more than hospitals. Hospitals represent only half of all available job openings.)

Communications, interpersonal, and organizational competencies should be expanded upon or intensified. On the administrative side, a checklist of skills should include basic medical terminology, simplified medical coding and reporting, basic supervisory skils, the rudiments of accounting, budget preparation, inventory management, and scheduling. A basic introduction to labor and community relations is essential as administrators must commonly work with both these factions.

For those leaning toward education, strength and competencies are needed in group communications skills, simplified training and counseling techniques, community and individual outreach. Students must not only know how to identify community resources, but how to use them and develop them to their fullest potential. Basic lessons in community organization and network building are also essential. In addition, they must be able to use and develop simple media for health communications.

Finally, all health occupations students but particularly those interested in education must have competencies in consumer health including skills in advocacy, basic self-care, medical terminology, and health risk reduction.

I know the basic thrust of your meeting these two days is to take your health occupations education core one step further--to the technical level. However, I would urge you to do so cautiously. The truly technical areas of health care are changing so rapidly that despite our best efforts, foresight now may prove only to be hindsight later. The key to future survival and job growth for all health workers lies in adaptability and flexibility. Using vocational education as a springboard, you must produce thinkers, not doers. The more broadly prepared students are, the more generic their skills, and the stronger their literacy, the more prepared they will be to secure the jobs of the 1990's, hold the jobs of the 1990's, and most importantly, advance up the health care career ladder into the 21st century.

THE FUTURE FOR THE CLINICAL LABORATORY

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As a discussion document, this paper represents the writer's opinions based upon a review of the evolution of clinical laboratories over the past thirty years, and on readings in the biological, medical and physical sciences in synthesis with a personal view of societal changes now occurring and likely to occur in the future. There is no pretense that this paper is based upon elaborate statistical documentation, but is offered only as a personal vision of trends in the clinical laboratory field.

Futurists are prone to speak of the changes occurring in each of our worlds as being "revolutionary." To me, this word implies an abrupt radical change. Certainly in some political systems, such a description is appropriate, but I do not think such a description should be applied to changes in the clinical laboratory. The raison d'etre of the clinical laboratory is as a service to society, based upon the application of principles of the physical and life sciences. As such, its change over a period of time should be looked at more as an evolution rather than a revolution. To be sure, its evolution at times and in small areas may be rapid, but it always evolves from previous scientific information. Any revolution that might occur will most likely be in response to social, political or judicial revolution.

The presentation of the laboratory now, and as it may exist in the future, might best be done through a few charts which will attempt to outline current function and its evolution toward changes in the future (see Appendix). These charts will try to show that in response to changes in population, society, expansion of our scientific knowledge, and availability of instrumentation, the clinical laboratory will slowly change in its stress on services, on how it will respond to society and in its possible role in shaping society.

How Do Population Changes Cause Change in the Laboratory?

Appendix 2 shows the current and projected distribution of the population with respect to age for the years 1980, 1990, and 2000. The graph indicates that as we progress toward the twenty-first century our population will change in its age distribution with a major increase in the thirty-five-year and older group and an increase in median age of the population from 30.2 years in 1980, to 35.5 years at the turn of the century. This is due in part to an increased life expectancy and a

decreased birth rate. Other graphs and tables published in Social Indicators III indicate that over the decade 1970 to 1979 the days of bed disability per person showed a slow but steady increase as did the days of restricted activity per person for the same period. Other charts from the same publication show that although the rate of death from heart disease is slowly being reduced, the rate due to malignant neoplasms has increased, especially in the middle aged and elderly.

Changes such as these, and especially the increase in longevity in an expanding population, will put increased demand upon the laboratory's capacities for the early detection of illness, especially of the middle aged and elderly, and increased demand to provide supportive data for choosing and maintaining chemotherapy.

How Does Science Cause Change in the Clinical Laboratory?

Laboratory medicine as seen in the general clinical laboratory has as its tools a panoply of methods, technics and instruments for the production of useful medical data. The laboratory is developed from an integration of knowledge obtained from the basic sciences and from the medical sciences by the scientist whose function it is to apply this knowledge to the production of methods and instruments which the clinical laboratory can utilize. Appendix 1 is a simplified diagram of the pathways established toward producing the "tools" of the clinical laboratory.

Theoretic knowledge, which may have its beginnings in either the pure sciences or in the medical sciences, is assessed by clinical medicine and applied to medical problems. If the information is judged to be medically useful, the applied scientist will attempt to establish less complex methods or instruments which can provide this information in a timely fashion. These methods are then turned over to the clinical laboratory to be used as an added tool in laboratory practice. An example of this course of events may be demonstrated in the area of protein chemistry.

As early as the end of the 19th Century, life scientists recognized that normal human serum contained at least one substance which could inhibit the enzyme trypsin from breaking down proteins. However, for two reasons, no investigation was launched to determine its characteristics and actions. First, methods and technics available at that time were not effective in isolating the substance in its active form. Second, clinical medicine could not demonstrate any

disease or condition in which this inhibitor, since named alpha 1 - antitrypsin, was implicated. It remained until the 1950's for methods of isolation to be developed so that alpha 1 - antitrypsin could be purified and studied.

Basic research went on through the late 1950's and 1960's to describe the chemical and physical action of the substance. It remained as an interesting but not medically pertinent substance until the early and mid-1970's, when it was shown that its deficiency has major implications in a pulmonary disease, emphysema. Later, it was also shown to be involved in childhood cirrhosis and neonatal cholestasis.

Now, with clinical medicines' demand for its assay in diagnosing such conditions, the clinical laboratory has adopted several technics for the assay of this substance. At present, the methods are difficult and require special care and skill. Therefore, the assay is done only in specialized laboratories. However, with the demand for testing for this protein on the increase, applied scientists have now developed instrumentation which will permit rapid and early performance of these assays. Since 1980, such instrumentation is being installed with increasing frequency in routine clinical laboratories.

How Does Societal Activity Cause Changes in the Clinical Laboratory?

To quote from Social Indicators III, "Because lower mortality rates result in greater proportion of the population living to ages when susceptibility and exposure to health problems become inevitable, the preventive aspect of public health takes on added significance."

The goals of prevention can be broadly conceptualized as a societal activity to avoid future health problems and an effort to lessen existing health problems. This will be attempted by control of environmental and behavioral factors which influence the onset of disease or other public health hazards, and by modification of these factors, as well as by affecting the body's physiological status toward prevention of disease.

The clinical laboratory has always been involved in assessing the body's physiologic status, more often in disease detection than in disease prevention, but as society's attention continues to turn more towards an interest in health maintenance and prevention, so too, will the clinical laboratory's attention be refocused. This is also true of society's attention toward the environment and toward behavioral modification. It is to the degree that society insists upon

environmental change and behavioral change that the laboratory will change its activity in these regards.

For example: For many decades now, the community has understood and been concerned about the major role drinking water plays in the spread of infectious disease. Clinical laboratories, especially those in rural areas, have always been involved in water testing. As concern increases over chemical pollutants, the clinical laboratory may again for the public health become the testing station.

As a further illustration, for several decades society has been insistent upon programs of immunization. The laboratory has not generally become involved in these programs. However, in the last decade, with new immunologic tools, the laboratory has become active in determining degrees of immunization or susceptability risk in population, again demonstrating the increased involvement of the clinical laboratory in public health as the methods become available.

A third area of activity involves behavior modification. The laboratory's contribution in this area at present is mainly through the toxicology section, where the laboratory's ability to detect drugs and alcohol has been used to add strength to behavior modification programs.

As society's interest in health maintenance becomes more pronounced, and the laboratory's abilities to respond rapidly and inexpensively increase, there will be other areas in which the laboratory expansion will occur. An obvious area for future expansion will be in assays to determine nutritional status. There currently are a few laboratories which have already become involved in nutritional assay activity.

THE PRESENT

How Does the Laboratory Function Now?

To examine the role and function of the clinical laboratory in the future, we must first understand its present role. The clinical laboratory was established and is dedicated to the service of the patient through the production of analytical data which can be used in the diagnosis of an illness, the regulation of therapy, or for the confirmation of functional health of tissues and organs of the body.

Usually, the clinical laboratory is looked upon by the layman as a single entity. It is not. It is a grouping of several activities, all related to each other in

varying interrelationships by a common foundation in scientific fact, theory and skill.

In smaller institutions such as hospitals, small clinics, health maintenance organizations, public health facilities, and small proprietary laboratories, the entire laboratory may occupy only one room with each of its functions segregated to an area of that room, but viewed as a whole, its activities are integrated. In a like fashion, the technologist in the laboratory usually functions broadly in the laboratory through an integrated knowledge and skill base to provide specific data for decision making by other health providers, usually a physician.

In larger institutions, although the laboratories still represent a generally integrated function, the volume of the workload causes a more distinct segregation of each function into discrete, almost autonomous, units such as clinical chemistry, hematology and blood banking. Technologists in each section have more specialized sets of knowledge and skills than in the smaller laboratory. However, the information produced from such a system is still integrated, in that data from one unit is physiologically and biochemically related to the others and must be kept so to be of benefit to the patient.

Laboratory Functions

Currently, the laboratory's primary function is to provide the physician with data upon which to base diagnostic decisions concerning a patient's illness. To a more limited extent, the laboratory also functions to provide data from which the physician can select and regulate therapy for treating an illness. To a still more limited degree, the laboratory provides some data to support the health status of those in our society who choose to be concerned about their health on a prospective basis.

Laboratory Communications

By far, the preponderance of laboratory data is generated in response to the physician's request. In fact, several years ago, it was only the physician or dentist who could request laboratory work. In the last few years, dentists are being trained to have concern for the general health of their patients. As a result, dentists are increasing their use of the laboratory. Newer health providers, the Physician's Assistnt and the Nurse Practitioner, are also increasing the utilization of laboratory facilities.

Facilities Utilized

The clinical laboratory in a fairly sizable hospital is made up of several functional sections which cover large areas of space. These include the following:

Clinical Chemistry

The area devoted to clinical chemistry is typically heavily automated and has a large diversity of instrumentation. The section is capable of assaying body fluids from hundreds of patients a day for 20 to [illegible] various chemical blood constituents per patient. In addition, the laboratory is capable of doing a large variety of other assays which are not requested as often and which are carried out by either semi-automated or manual methods.

If the laboratory administration should decide that it cannot or does not wish to expend the resources to do a particular test, it may elect to send the specimens to a regional "reference laboratory" (which is usually a privately owned and operated business entity) for the performance of the required test.

Hematology

This area is usually also highly automated for general test procedures, but it also has several areas of testing which are tended to manually.

Microbiology

Depending upon the size and type of hospital, this area may devote its efforts to the areas of bacteriology and mycology only, or it may also include a virology laboratory. Microbiology, until the late 1970's was operated on a completely manual basis. However, in the past five years, automated instruments have been designed to handle some of the more routine procedures.

Blood Bank

The blood bank in most hospitals is the area charged with supplying compatible blood for transfusion. Most of its procedures are done manually, or at best, in a semi-automated manner. It should be noted that although this area of the laboratory is involved in recipient and donor testing, it is in reality the supplier of a therapy in the same way that the pharmacy is, and the law so interprets its function.

Appendix 3 (Laboratory Activity) indicates the current relative distribution of laboratory testing among the major sections of the clinical laboratory.

Laboratory Staff

The staff needed to operate today's clinical laboratory reflects its organization and functions. Many laboratory employees are subject to certification or registration procedures. (Because of the many certifying, licensing and registering agencies in this field, it is difficult to speak of one nomenclature.) In this paper, the variety of laboratory staff members will be described by the nomenclature most often used by laboratory management. At present, these personnel categories are:

Certified Laboratory Assistant (CLA)

This person is used as an assistant to the more highly trained staff to prepare regents, perform clerical work, and provide general help to the staff and to do limited technical work under direct supervision. Training in the past was provided through on-the-job training or in accredited hospital-based laboratory schools. These schools require the candidate to have a high school diploma upon admission. However, in several states of the union, proprietary schools without AMA accreditation have been operating on this level. In addition, there are several successful programs in New York State operated by the Board of Cooperative Educational Services at senior high school level and post-high school level.

Approximately three to four years ago, the CLA classification was scheduled for termination in 1982 because the American Society of Clinical Pathology (ASCP) felt that training in so limited a manner did not provide educational upward mobility. It is the writer's opinion that although the job may be limited, it is by no means unrequired nor "dead-ended."

As BOCES has discovered, instruction in this area provides several valuable things:

a. Laboratory workers on this level are easily trained to perform venipunctures to obtain patient blood specimens.

b. This level of employee, when trained carefully, is able to provide low level technical help in separating blood specimens by centrifugation, labeling and controlling the flow of specimens to the several sections of the laboratory.

c. Laboratory assistants can perform the more routine tests under direct supervision.

d. They are useful in maintaining clerical entries into laboratory accession books and recording data, or if there is a computer, entering the data into computers.

e. They are useful in maintaining stocks of supplies and equipment.

f. They may be employed in research laboratories where procedures may all be manual and highly repetitive.

g. Most importantly, it is the incentive and interest engendered by such programs that provides the field with future technicians and technologists. The laboratory aid program at BOCES II in Sayville, New York is an excellent example. Several of its graduates have successfully progressed through local community colleges and have been accepted into the upper divisional program in Medical Technology in the School of Allied Health Professions in S.U.N.Y. at Stony Brook.

Although the ASCP has terminated the CLA classification, they have provided an educational track which requires 30 semester hours of accredited college education in addition to graduation from a post-high school accredited Laboratory Assistant program. This certification is now referred to as a "Medical Laboratory Technician Certificate" (MLT-C), as opposed to certification as a Medical Laboratory Technician with an associate degree.

See Appendix 4, pages 1 and 2, for general requirements for certification. See Appendix 5, pages 1,2, and 3, for general discussion of areas of activity and capability of medical laboratory technical personnel.

Medical Laboratory Technician (MLT)

The MLT is a two-year college graduate with general training in the medical laboratory. The educational emphasis is upon skill and dexterity, with only moderate emphasis on scientific theory. It is meant to provide laboratory workers who are equipped to carry out analyses under supervision of medical technologists and other supervisors (see Appendix 4 and 5).

Medical Technologists (MT)

Medical Technologists represent the upper level of the general laboratory staff. They are augmented by people with advanced degrees including the Ph.D. and M.D. The Medical Technologist may be trained as a generalist with reasonable education and skill, training in each of the major areas of the laboratory, or they may be trained as specialists in any of the many areas. Depending upon the educational institution, they receive moderate to heavy stress upon the theoretical foundations of laboratory technology based upon the sciences, medicine, and medical technology.

"NEAR FUTURE" CHANGES IN THE CLINICAL LABORATORIES

Laboratory Functions and Activities

By 1990, the laboratory will have begun some major changes.

First, the laboratory of the future will still be primarily concerned with data production for diagnostic purposes. However, by joining the powerful new analytic tool, the computer, to its own knowledge of the intimate relationships of physiological and biochemical changes in the etiology of disease, the laboratory will provide many of the diagnostic decisions which have previously been dependent upon the human intellect of the health care provider.

Second, the currently minor area of drug monitoring will become a major function in the 90's, as a means for optimally regulating dosages of highly potent medication and controlling their synergistic effects.

Third, the areas of protein chemistry and immunology which have begun to increase slightly in the late 70's and early 80's will by 1990 have evolved to a major laboratory activity involving many diagnostic procedures. As the 90's progress toward the new century, these areas will also become highly involved with individual health risk predictions.

Finally, with the population's realization of their major stake in their own health care, individuals will seek out many avenues for involvement in their own well-being. During the 1980's, the present cults of health will at first proliferate, as citizens seek for truth in such things as faith-healing, naturopathy, holistic health care, etc. During this period, mysticism will slowly be replaced by a desire to found health care theories upon some more factual base. This may take the form of increased laboratory testing for nutritional or biochemical aberrations.

But by the mid-90's, most people will accept the concept of health maintenance and disease prevention and become involved in wellness centers. These obviously would require that laboratories participate in data production, not only to establish levels and goals for wellness, but to also establish a personal laboratory data base for each individual.

Each of the sections of the laboratory outlined in the earlier sections will still be functional but each will undergo some changes (see Appendix 6).

Microbiology will be fully automated and computer controlled by 1990. Its function as a detector of infectious organisms will remain, with a major expansion of the virology laboratory and the section devoted to environmental monitoring.

Immunology, which in the 60's and 70's was usually a part of microbiology, will grow into a major department of the laboratory primarily to identify specific abnormal body proteins and to monitor organ and tissue transplantation responses by the host tissue.

Blood Banking will have a major change by 1990; blood transfusions will be at a minimum but replaced by artificial "blood." Such substitution has already taken place on an experimental basis. However, the blood bank will be transformed into the Tissue Bank where similar procedures will take place now involving a much more complex genetic and immunologic system of tissue typing and matching.

Cellular Hematology will also be fully automated and will change only insofar as it volumes will go up to complement the increased use of potent chemotherapy and to match the advancement in understanding of cellular activity in the abnormal patient.

Clinical Chemistry, by 1990, will have changed most drastically since the rate of basic science information being compiled in this area has led to hundreds of possible tests. Also, instrumentation has been developing and changing rapidly since the mid-1960's. Automated devices have become very large and monumentally expensive. The major laboratory expenditures for supplies and equipment have been in this area. With the economic changes

expected in the 1980's, much of this instrumentation will become prohibitive even for large health institutions. The most likely solution will be the sharing of chemistry laboratory facilities by several institutions. There will thus be fewer but larger laboratories in the clinical chemistry area of laboratory practice.

Other changes will come about which will be based upon newer knowledge, such as that relating to receptor sites on the cell membrane, which determine the inner responses of the cell. Assay for such sites will play a large part in identifying and controlling endocrine and exocrine diseases. As mentioned previously, drug assay and monitoring will become an important area of activity by 1990. The areas of protein chemistry and immunology are currently enjoying major and rapid expansion. This has come about because of many new methods for protein separation and identification, such as protein electrophoresis, radio-immune assay, fluorescent and radioactive tagging, etc. In addition, our knowledge of the proteins and the immune system has expanded rapidly during the last decade and is expected to continue its expansion into the 80's and 90's. Along with our understanding of the proteins, the area of genetics and a new science, genetic engineering, will witness rapid expansion and will probably provide areas for assay by the clinical laboratory.

Who Will the Laboratory Respond and Communicate With in 1990?

Primarily, the laboratory in 1990 will still support the efforts of the physician. However, the expansion of health providers requesting laboratory data, added to the client's freedom to request data, will lessen the physician's and dentist's roles as laboratory utilizers.

Facilities

As described under functions and activities, the most important change may come about in the removal of the major chemistry function from the hospital to a shared installation. At the same time, it may become economically feasible to centralize several other functions such as microbiology and the tissue bank. Many laboratories then, by 1990, are likely to be removed from the local hospital and established in a centrally shared area. This will leave only the more routine and emergency laboratory testing within each hospital.

Additionally, the configuration of the laboratory will change. Laboratories of the 80's are placed in separate areas dedicated to one discipline. This forces a higher cost for maintenance. Automated instruments are based upon high technology, and electronic equipment which requires meticulous maintenance. It is conceivable that by the 1990's, many of the instruments will have "universal" parts. Instrument companies will even produce "sets" of instruments, all of them with a common design, to function in each of the areas of the laboratory. If so, the physical laboratories will change from divided areas to combined common areas, where all the instrumentation can be maintained easily and in a like manner by highly trained individuals.

Staffing the Laboratory in 1990

It should be evident that by 1990, just as the laboratory's functions, activities, instruments and facilities will be changing, so too, will its staff. By 1990, the general staff of the laboratories will have changed in several ways.

First, because of the increase in automation in the majority of laboratory sections, the middle level technician trained in manual skills may find reduced demand and be replaced to some degree by high school graduates who have had limited training or rather acclimatization in clinical laboratory practice. They will find their usefulness in venipuncture teams, specimen preparation, supplies and equipment procurement and maintenance, and primarily in data recording and transmission. They will also have duties involving specimen presentation to the automated instruments.

The middle level technician will be involved in those areas of the laboratory which are routine but not automated.

The medical technologist with training in theory as well as skill will become the primary professional entry level person. This person's duties will involve instrument regulation and calibration, management skills, and manual testing in the more specialized or more complicated areas which require a strong basis of theoretical knowledge.

Because of the massive amount of instrumentation, the larger laboratories will also be staffed with electronic technicians whose job it will be to maintain the electronic and mechanical integrity of the instruments.

In addition, computer programmers and technicians will be available to program and trouble-shoot the computers.

Changes in Workload in 1990

With our population growing older, there will continue to be a stress on disease diagnosis, with some changes in the diseases of concern. The rate of infectious diseases in the population will probably slowly go down due to newer and better antibiotic therapy and more easily accessible laboratory information concerning the host-infectious agent relationship, supported by new and increased automated procedures.

On the other hand, as our knowledge of the causes of cancer and organic diseases increases, the laboratory will expand its activities in the areas of biochemistry, immunology and genetics. The laboratory will probably respond with new tests for disease detection by drug detection and quantitation to monitor chemotherapy, and by phenotypic and genotypic determinations. Better understanding of the biochemistry of the cell, especially in terms of what and how different cell functions are turned on or off, will also bring about an increase in laboratory testing of these "sites of switching." Such areas are already being investigated as receptor sites on the cell membranes.

By 1990, because of society's greater awareness of the need to maintain individual health, an increase in laboratory testing in response to questions of degrees and areas of wellness or health status may be expected.

By the 1990's, several phenomena which had begun in the late 70's and early 80's will have progressed to a major stage and will, therefore, influence the laboratory's distribution of functions, activities, and even its physical appearance.

During the 1970's, the laboratory experienced a major increase in the demand for laboratory data. Physicians were and are being trained to use massive amounts of data to support their decision making process. Laboratories rapidly automated their services, partly to satisfy their demand, and partly as generators of that demand by providing new or automated tests.

The volume of data began to be overwhelming, so computers were enlisted to handle the clerical work. As laboratories became more adapted to automation and computers, they looked for ways to join the two so that control of the automation could itself be more closely controlled and automated. The marriage of automation and computer will be fully consumated by 1990.

The computer story in medicine will go beyond that marriage. It is certain that by the early 1990's, the computer will become not only a major repository of medical data, but an active part of the decision making process. Added to this, it

is almost a certainty that almost every family unit will have its personal computer at home. This will be used not only for playing games, storing data or solving simple problems, but also with the capability of interchange of information with larger computers for everything from banking to medical management. Those of us with an interest will be able to be tested by "wellness center" laboratories to determine our biochemical make-up which then can be entered into our personal computer and, in turn, by inter-communication with a medical computer to provide us with preventive medical information. An example might be the best diet over the next month or two, to achieve better physiologic and biochemical balance. The computer will also provide advice on weight reduction, preventive health maintenance, or direct us to see our physician because of the results of a laboratory test, or even alert the physician that the client is in imminent medical danger.

THE 21st CENTURY

Since the major premise here has been that the laboratory will change by evolution rather than revolution, the prediction for the year 2000 should in general represent a gradual consolidation of the previous 10 to 15 years, barring unforeseen happenings.

By the mid-21st Century, the younger population will be an interesting group. Many of them will be the products of long association with "wellness centers." This would mean that their parents were involved in such things as population selection and enhancement, in which the clinical laboratories will play a major role. They are part of the scenario that follows:

> When their parents decide to procreate, they will first ask the "wellness center" to do fertility studies, which will involve physiologic and biochemical monitoring to determine the correct time for conception. In addition, the father's sperm will be submitted to the laboratory for sex selection, since the parents, with the consent of the population control board, have decided upon a boy.
>
> During the early gestational period, the mother will order an amniocentesis to be done to confirm the sex of the child and to determine which of the gene combinations really has taken place. Knowing this, she and her husband could decide:

a. All is well - proceed with the pregnancy.
b. The HLA tissue typing shows a genetic combination which has a high risk of a certain disease (e.g., diabetes) in the child's later years. They may decide to terminate the pregnancy.
c. The HLA tissue typing is as in (b) but they are of the opinion that through recombinant-DNA technics, they can add or replace the troublesome gene with a more desirable one.

Assuming that (c) was their choice, the baby will be born at home or at the "wellness center," and the laboratory will again enter the picture by taking small samples of blood, urine, tissue, etc., to run through screening processes to establish the baby's biochemical and immunologic data base.

At the same time, a small amount of tissue will be taken to be stored in the cloning area of the tissue bank. This is a safety precaution against disease or accidental loss of a portion of the child's body. Should that happen, the bank will reactivate the cells, make them grow, and using the newer knowledge about activators of tissue regeneration and differentiation, the clone will be nurtured and differentiated to the point where the tissue bank can issue it to the surgeon for transplantation.

All during the child's formative years, he will be checked periodically at the "wellness center" and by the laboratory to update his data base and to determine whether all is well or if something is going slightly astray which, if not corrected, may turn out in a year or two to be a full-fledged disorder.

Along with this check-up, the laboratory will also make analyses to determine his nutritional status and balance of body constituents, and these will be reported to his personal computer for reference. If this data is subjected to a nutritional data program, the central computer will publish a daily diet and regimen for him to follow to correct any imbalances.

While all this will be going on with this young person, his grandfather, who has not had the benefit of genetic risk prediction, will be getting old, and having some of the same genes, will develop diabetes mellitus Type II which will be picked up in his annual wellness check-up. At first, control of his diet

will be sufficient to hold the disease down, but eventually, it is evident that he will need insulin therapy. This will be determined by the laboratory's tests for insulin level and insulin receptor site availability on the cell membrane.

Grandfather's physician will decide to prescribe insulin which will, at first, be closely regulated by the drug monitoring section of the toxicology laboratory, but to be sure that things go well, she will also order the old gentleman to wear a non-invasive monitor around his wrist which could follow his insulin levels, and by telemetry, relay the data first to his personal computer, and from there, to the central medical computer.

After running this course for several years, the physician will be notified by computer that the insulin dosage is not being regulated well enough to maintain the old man's stability. In response to this, the physician will order an "articificial pancreas" to be implanted under the old gentleman's skin. This pancreas is in reality a pump which is controlled by a microcomputer, which in turn, is controlled by a glucose sensing probe. Thus, the three parts comprise a closed loop sensing and dispensing system.

Obviously, as the years go by, people begin to wear down, and it has been shown that genetically, we are each geared to only a limited number of cell regeneration turn-overs. When Grandpa reaches this point, the laboratory during one of its routine check-ups will report that physiologically and biochemically, Grandpa is all worn out with little hope of regeneration. It will then be the physician's job in consultation with Grandpa, the laboratory and the computer, to set a convenient and logical date for TERMINATION.

The foregoing scenario, though seemingly Orwellian, is not too far fetched. Each of the mentioned pieces are either already here or are currently involved in the experimental chain. It places an even larger responsibility upon each of the actors than has ever been placed before. It makes clear that those who will be employed in the laboratory, as well as the physician, and even more importantly, each individual in such a society, will carry many responsibilities, not least of which will be major ethical and moral considerations in the birth, life and death of our fellow human beings.

What Sort of Training and Skills Should a Laboratory Worker Have for the Future?

The laboratory of tomorrow, as previously inferred, will be an ever-growing maze of instrumentation, the design and functions of which no one can predict well enough to project specific instructional objectives.

In fact, this is just as true for the 1980's.

Many programs in medical technology from high school programs to baccalaureate programs involve themselves in attempting to teach an endless spectrum of skills which are designed to operate specific pieces of instrumentation. This writer contends that such efforts are fruitless. Instrumental design and purpose has been, and will continue to be, a rapid ever-changing process with which educational institutions will never keep pace. Attempting to do so will only waste vast sums of money. What then should we teach our students to equip them for the amazingly complex future?

As stated in the opening remarks, science and medicine are evolutionary processes, that is, new discoveries and new technics and new instruments do not come about by some abrupt radical change. They are always founded upon basic general concepts of both the physical and life sciences. If this is true, then our job as educators can be both simplified and highly productive, if we expend our energies to teach the major scientific concepts and instill in our students the competencies and desires for continuing self-study and involvement in society. Instruction in highly specific skills and especially instrumental operation is a fleeting and wasteful activity in which our schools should not become involved. This type of skill training should be left to employers and the instrument manufacturers, since such skill is only useful if it is required for the particular job.

However, schools will need to use instruments and methods of the clinical laboratory to demonstrate these concepts and principles. It will be the task of our instructors to choose from these instruments and methods wisely.

First of all, the instruments must be chosen so that they demonstrate specific concepts and principles which are currently the basis of laboratory technology.

Second, these instruments must be constructed so that whenever possible, the student can see and study the internal workings and not just a "black box" with knobs, buttons and lights.

Third, and most importantly, the instruments and technics should be chosen to match the level of theory and skill expected of the student upon graduation.

Choosing levels of instrumentation beyond the expected student level is wasteful and damaging to the graduate, since they may not be given an opportunity to use advanced equipment in the position for which they were trained.

With these as our objectives, instruction should include several areas of study, each beginning in high school and expanding through the college years.

A. General Societal Skills

Communication - Verbal, Written, Listening, Reading, Typing, Computers
Interpersonal Technics, Team Concepts, Conflict Resolution
Ethics
Mental Hygiene
Management and Supervision, Employee Responsibilities
Societal organization
Medical Organization

The above areas should be considered most important since it is training in these areas that will produce the ethical, socially conscious, human health practitioner. It is most improtant to begin these as a major effort in high school.

B. The Physical and Life Sciences and Mathematics

Biology

Cell & Molecular Biology*
Physiology*
Cell Physiology*
Anatomy*
Gross
Microscopic
Genetics*
Biochemistry*
Immunology
Embryology

Chemistry

Inorganic*
Quantitative
Organic
Physical

Physics

Thermodynamics*
Optics
Electrical Circuits*
Electronics

Mathematics

Geometry*
Trigonometry*
Algebra*
Statistics*
Graphing
Calculus

Medical Technology

Clinical Chemistry*
Microbiology*
Bacteriology
Mycology
Virology
Hematology*
Cellular
Hemostasis

Medical Technology (con't.)

Serology
Immunohematology*
Body Fluids
Theories of Automation and Instrumentation*
Nuclear Medicine Technology
Research Methods
Laboratory Design and Management
Laboratory Safety*
Patient Safety*

Topics followed by an * should have their beginnings, at least as topics of discussion, in high school (see Appendix 7).

To repeat as this paper began, the clinical laboratory is a product of evolutionary change in the sciences.

It is a service organization which responds to the changes and needs of society. Its staff, then, must be educated to recognize and respond to the everchanging demands and influences upon them. This education should take the form of instruction in basic concepts and theories upon which laboratory practice is founded. In addition, as educators, we must be certain that in our zeal to provide high standards of skill in our students, we do not neglect the ethical nature of practice and the need for a humane social consciousness in us all.

Finally, prediction, according to an old Chinese proverb, is very difficult--especially with regard to the future.

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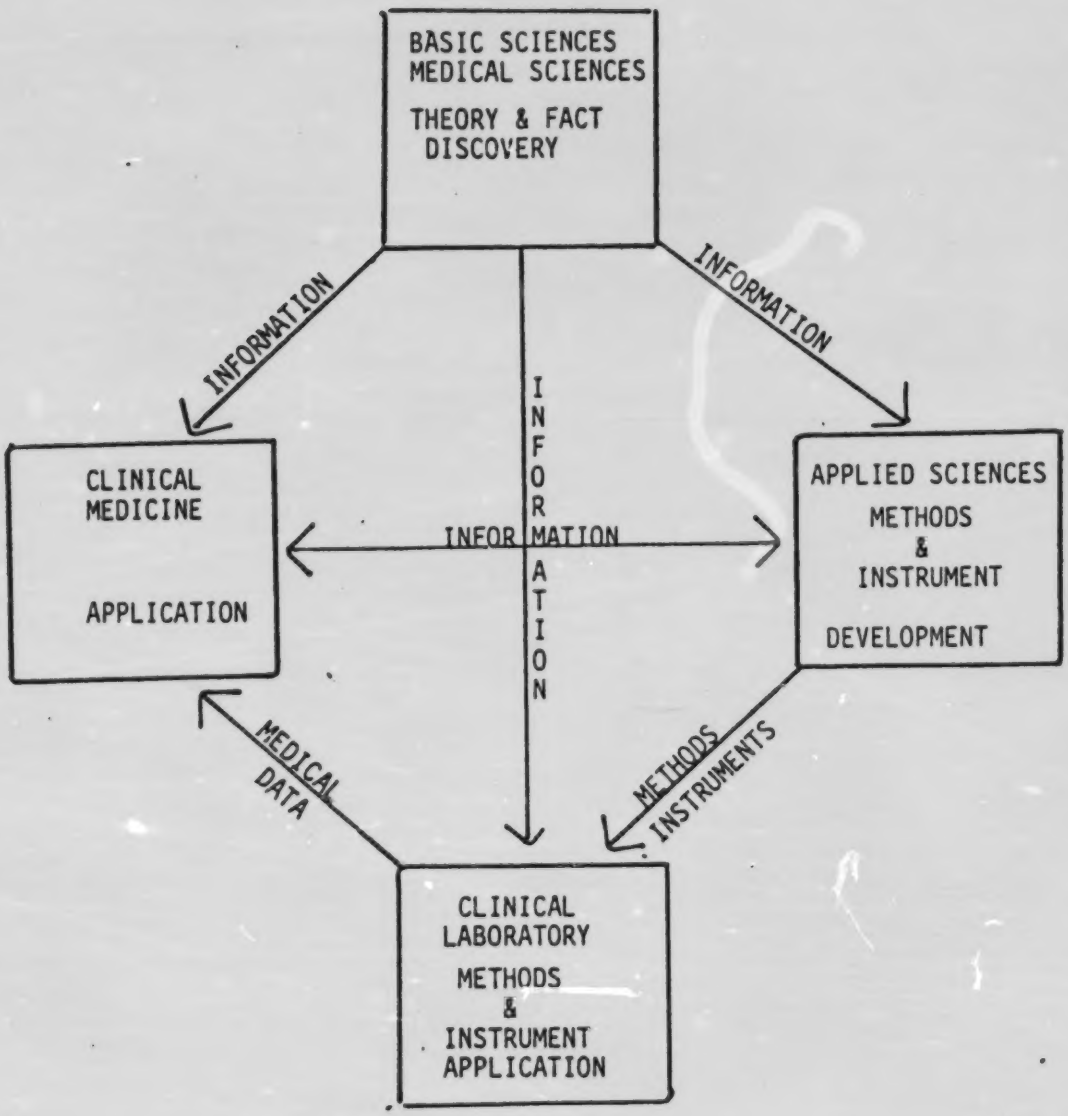
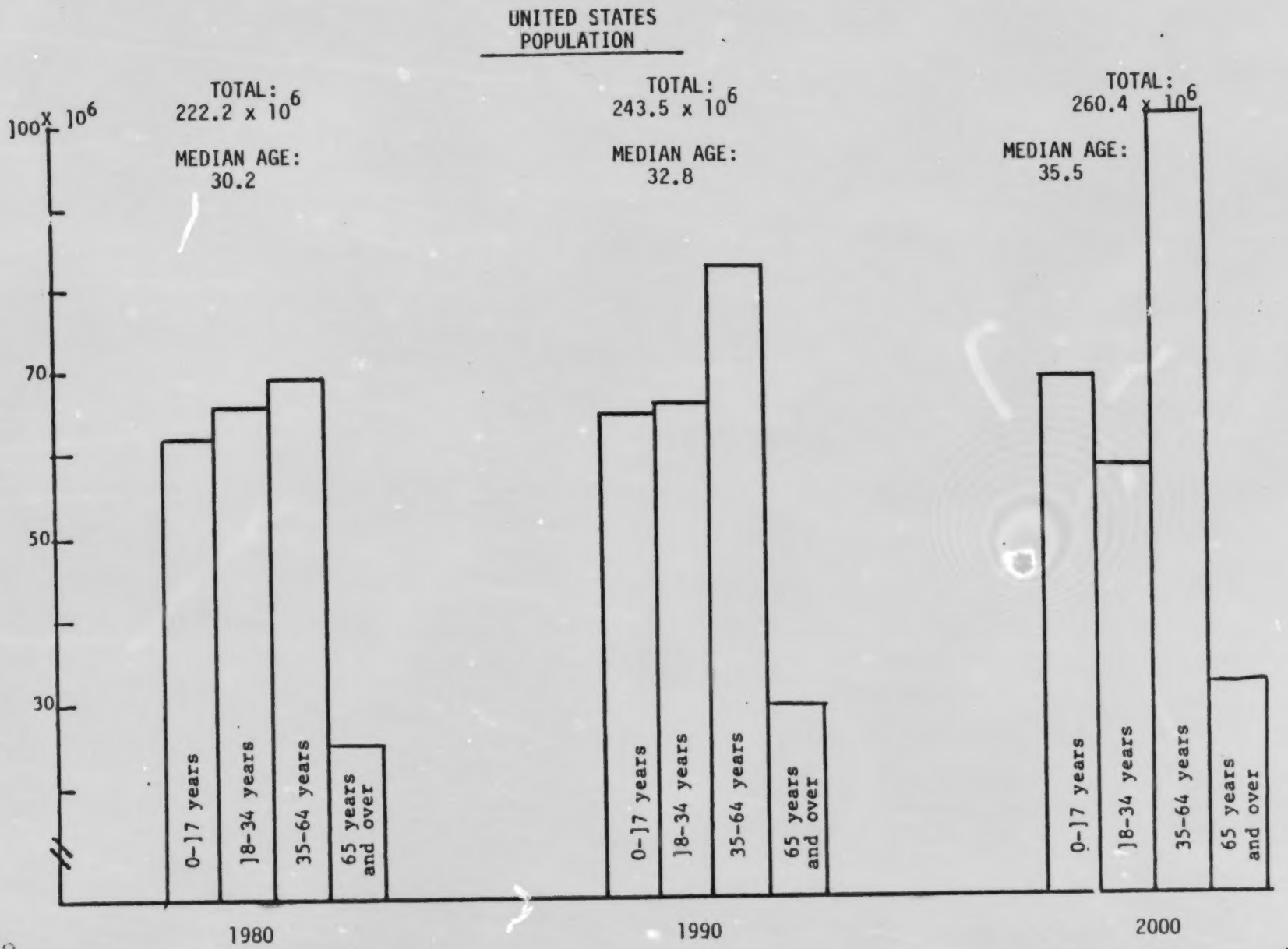


HOW DOES SCIENCE CAUSE CHANGE IN THE CLINICAL LABORATORY ?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MEDIAN AGE:
30.2
TOTAL:
243.5 x 10^6
MEDIAN AGE:
32.8
TOTAL:
260.4 x 10^6
MEDIAN AGE:
35.5
100 X 10^6
70
50
30
0-17 years
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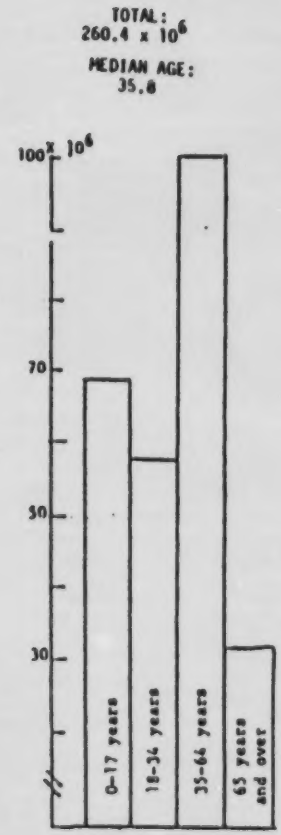
35-64 years
65 years and over
1980
1990
2000

YEAR 2000

UNITED STATES POPULATION



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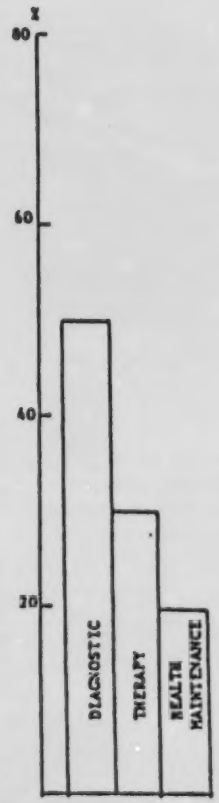

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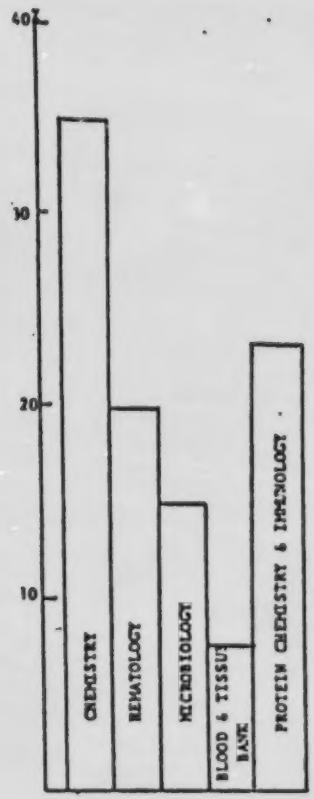

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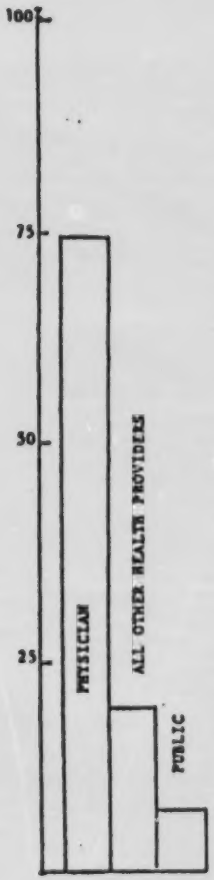
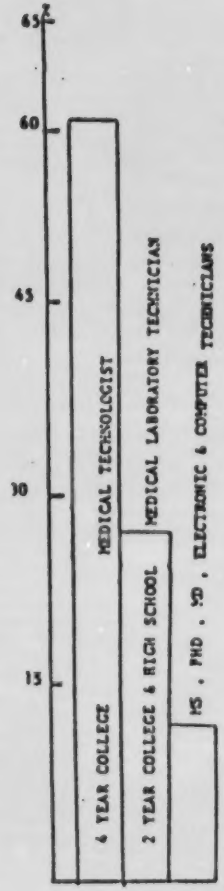


LABORATORY STAFF



CERTIFIED LABORATORY ASSISTANT, CLA(ASCP)

High school graduation (or equivalent) AND successful completion of a CAHEA accredited Laboratory Assistant program or military medical laboratory specialist program (MOS 92B30, NEC 8417 or 8506, AFSC 90450 or AFSC 90470 categories), OR

High school graduation (or equivalent) AND three years of full time acceptable clinical laboratory experience in the areas of blood banking, chemistry, coagulation, hematology, microbiology, parasitology, serology and urinalysis within the last five years, OR

High school graduation (or equivalent) AND basic military medical laboratory course (12-21 weeks leading to these categories: MOS 92B10 or MOS 92B20, NEC 8412 or NEC 8501, AFSC 90430), AND one year full time acceptable clinical laboratory experience subsequent to military training.

THE CLA(ASCP) CERTIFICATION EXAMINATION WILL NO LONGER BE OFFERED AFTER THE AUGUST 1982 EXAM ADMINISTRATION.

MEDICAL LABORATORY TECHNICIAN, MLT(ASCP)

Associate degree from a CAHEA accredited Medical Laboratory Technician program including courses in chemistry and biology, OR

Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university, including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND five years full time acceptable clinical laboratory experience in blood banking, chemistry, hematology, coagulation, microbiology, parasitology, serology and urinalysis within the last seven years, OR

Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND graduation from a military medical laboratory specialist program (MOS 92B30, NEC 8417 or 8506, AFSC 90450 or AFSC 90470 categories), OR

30 semester hours (45 quarter hours) of academic credit from a regionally accredited college/university including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND successful completion of a CAHEA accredited MLT-C program (previously identified as a Laboratory Assistant program), OR

Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND CLA(ASCP) certification, OR

Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university including 6 semester hours (9 quarter hours) of chemistry and 6 semester hours (9 quarter hours) of biology AND successful completion of a structured non-CAHEA accredited MLT program AND one year full time acceptable clinical laboratory experience in blood banking, chemistry, hematology, coagulation, microbiology, parasitology, serology and urinalysis within the last three years. This year of experience must be subsequent to the completion of the structured program.

MEDICAL TECHNOLOGIST, MT(ASCP)

Baccalaureate degree from a regionally accredited college/university, including 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND successful completion of a CAHEA accredited Medical Technology program, OR

MLT(ASCP) certification AND a baccalaureate degree from a regionally accredited college university, including 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND three years of full time acceptable clinical laboratory experience in blood banking, chemistry, coagulation, hematology, microbiology, mycology, parasitology, serology, and urinalysis within the last seven years. At least one of these years of experience must be acquired post baccalaureate degree and at least two years must be under the supervision of a certified pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist OR

CLA(ASCP) certification AND a baccalaureate degree from a regionally accredited college university, including 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND four years of full time acceptable clinical laboratory experience in blood banking, chemistry, coagulation, hematology, microbiology, mycology, parasitology, serology, and urinalysis within the last seven years. At least one of these years of experience must be acquired post baccalaureate degree and at least two years must be under the supervision of a certified pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist, OR

Baccalaureate degree from a regionally accredited college/university, including 16 semester hours (24 quarter hours of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics, AND five years of full time acceptable clinical laboratory experience in blood banking, chemistry, coagulation, hematology, microbiology, mycology, parasitology, serology, and urinalysis within the last seven years. At least two of these years of experience must be acquired post baccalaureate degree and at least two years must be under the supervision of a certified pathologist (certified by the American Board of Pathology or eligible) or an appropriately certified medical scientist and a certified medical technologist.

The American Society of Clinical Pathologists announced in 1968 that another category of laboratory workers to be called *medical laboratory technician* was to be created. The ASMT did not endorse this move for several reasons. The general public was considered unable to distinguish between laboratory assistants and medical technologists, and it was felt that the addition of still another category would simply compound the confusion. The ASMT was in favor, however, of accepting the new category, provided the LA classification was eliminated.

The American Society of Clinical Pathologists proceeded without consultation with medical technologists, and the category of medical laboratory technician was established.

The first examination for medical laboratory technicians was given by the Registry in November, 1969. Twenty-six men and women successfully passed the examination and received certificates. Before the establishment of this category, several community colleges had set up medical laboratory technician programs, despite the fact that the only certification open to their graduates was that of laboratory assistant.

One of the problems presented by the existence of three levels of laboratory workers has been a lack of definition and general understanding of duties and responsibilities. In 1973 the ASMT approved position papers which define the various levels. These position papers were approved by democratic action of the society. They have been approved by NAACLS and the Board of Registry and have been endorsed by ASCP. The position papers are reproduced with the permission of the American Society for Medical Technology.

From: M.R.Williams, D.S.Lindberg
An Introduction to the
Profession of
Medical Technology

Laboratory Assistant (LA)

The following capabilities are expected of the LA at career entry:

Performing analyses: He shall be able to perform the repetitive uncomplicated procedures, use common instruments and recognize obvious problems. These involve single-step processes where discrimination is clear, errors are few and easily corrected, and results or procedures can be confirmed with a reference test or source within the working area. Maximum proficiency in following a set of prescribed instructions, strategies and criteria is expected.

Solving problems: Decisions are made with the aid of simply stated, predetermined criteria or strategies.

Systems control, organization and communication: The ability to report work performed fully and clearly is expected.

Supervision and management: He shall be responsible for his own work as assigned by the supervisor.

Teaching others: Teaching responsibilities include only the demonstration of the performance of routine procedures when assigned to do so by his supervisor or an educational director.

Continuing education: This person shall participate in some form of continuing education or in-service program.

It is expected that this person will function at a maximum degree of effectiveness in professional attitudes, patient relations, and integrity. The group of workers represented by this level has had a structured program of clinical training.

Medical Laboratory Technicians (MLT)

In addition to the capabilities of a LA, the MLT is expected to have these capabilities.

Performing analyses: He shall be able to perform all of the repetitive tests in an up-to-date medical laboratory. This includes discrimination between closely similar items and correction of errors by use of pre-set strategies. This requires a knowledge of specific techniques and instruments and the ability to recognize factors which directly affect procedures and results. For confirmation of results, knowledge of more than one test within each specialty area is expected. He shall be able to use and monitor quality control programs within predetermined parameters. He shall be able to perform simple maintenance of instruments.

Solving problems: It is expected that he shall be able to follow prescribed strategies to recognize a problem, to identify direct causes (technical or instrumental) and to make simple corrections. It is expected that predetermined criteria will be available which anticipate problems and specify alternatives from which decisions may be made. At points where no pre-set criteria for decision making are available, the MLT would be expected to consult the supervisor.

Systems control, organization and communication: He shall be able to log in specimens, keep accurate records, prepare reports, and transmit reports clearly and completely.

Supervision and management: He shall be responsible for his work and capable of assuming responsibility for the work of the person in a direct, supportive position if asked to do so by his supervisor. Usually, he supervises only one or two people. He is also expected to have the ability to evaluate subordinates and students when asked to do so by his supervisor.

Teaching others: Teaching responsibilities include only the demonstration of the performance of routine procedures when assigned to do so by his supervisor or an educational director.

Continuing education: Active participation in continuing education and in-service programs is expected.

It is expected that this person will function at a maximum degree of effectiveness in professional attitudes, patient relations and integrity. The group of workers representing this level of expectancies have associate degrees which include courses in the professional field as well as clinical experience.

Medical Technologists (MT)

The MT has completed an academic program with courses in the professional field, as well as clinical experience, and has earned a bachelor's degree. These additional capabilities are expected of him at the beginning of his career.

Performing analyses: He shall be able to perform complex analyses which require a complex network of steps and variables, fine-line discrimination of several items, correction of a variety of errors, and use and maintenance of complicated instruments. This necessitates an in depth knowledge of techniques, principles and instruments and their interrelationships. In order to confirm results he must be able to recognize interdependency of tests and must have knowledge of physiological conditions affecting test results. Since many analyses performed at this level have no means of confirmation, the MT is expected to have the capability and resourcefulness which permits him to assume the responsibility and accountability for accurate results. An expectation of major importance is the ability to establish and monitor quality control programs. He is expected also to be able to modify or design procedures.

Solving problems: He is expected to be able to recognize a problem, identify the cause (technical, instrumental or physiological), synthesize alternatives and determine solutions. This ability should extend to implementing the solution where appropriate. He shall be able to handle problems which are anticipated as well as those which are unexpected. This level of worker is expected to be able to make decisions based on a resource of information, facts, and concepts as well as foresight, judgment, and sensitivity to contributing factors. He should be able to prepare criteria and strategies which would assist subordinates in solving anticipated problems or guiding them in making routine decisions (i.e., use of quality control).

Systems control, organization and communication: Expected competencies in this area will range from keeping simple records (logging of specimens, recording results, etc.) to preparing budgets and schedules. It may further involve knowledge and understanding of the complicated operations associated with computerization of records. He must have communication skills in translating ideas and facts to a variety of persons both within and beyond the limits of the laboratory.

Supervision and management: He is expected to be responsible for his own work and decisions; to be aware of basic management skills; to be capable of supervising others and to be accountable for all work performed in his area of supervision. These responsibilities will require the basic evaluation of procedures, equipment, and people (peers, students, subordinates) and will require a knowledge of facts, concepts, skills in techniques and instruments, as well as knowledge of personnel relations and group functions.

Teaching others: Teaching responsibilities may vary from simply assisting someone else and/or bench teaching to designing, implementing and evaluating a teaching-learning experience through informal and formal programs (undergraduate, graduate and continued education).

Continuing education: It is expected that this level of worker will actively participate in continuing education and in-service programs, especially recognizing his responsibility to continue learning in areas of need, such as educational methodology, managerial skills, evaluation techniques and future planning.

It is expected that this person will function at a maximum degree of effectiveness in professional attitudes, patient relations and integrity.

SOCIETY ISSUES

House Adopts Position Papers

Diana Mass
Chairman
Competence Assurance Council

Rapid developments in the clinical laboratory sciences profession have resulted in extensive changes in the services provided by clinical laboratory personnel. The breadth of practice and the depth of knowledge now required to provide these services are reflected in the scope and levels of practice evident in today's clinical laboratory. To ensure that these services are of high quality, ASMT has assumed the responsibility of providing laboratory personnel with opportunities to keep abreast of expanding technologies and to maintain their competence to perform their designated tasks. This responsibility is awesome, and ASMT is determined to approach this sophisticated challenge in a systematic manner as the Competence Assurance System evolves.

Two papers, adopted by the ASMT House of Delegates in June, are *The Scope of Practice of the Clinical Laboratory Sciences* and the *Levels of Practice of the Clinical Laboratory Sciences. The Scope of Practice* identifies, in general terms, services provided in clinical laboratory sciences. The *Levels of Practice* identifies and describes performance roles at several levels of responsibility which ought to exist in the clinical laboratory. Both papers are published here in their entirety.

To be effective, the Competence Assurance System must contain educational and assessment mechanisms which are determined by explicitly defined levels of practice. By defining roles in terms of specific knowledge, skills, and attitudes required for acceptable performance, the levels of practice become the reference points of the Competence Assurance System. These levels of practice will be monitored and updated continually to reflect the changing and expanding roles within the parameters of the profession.

SCOPE OF PRACTICE

Clinical Laboratory Professionals, as members of the health care team, are responsible for:

1. Assuring reliable test results which contribute to the prevention, diagnosis, prognosis and treatment of physiological and pathological concerns. This includes:
   a. Producing accurate test results
   b. Assessing and improving existing laboratory methodologies
   c. Designing, evaluating and implementing new methodologies
   d. Integrating, correlating and interpreting test data
2. Designing and implementing cost-effective administrative and quality control procedures for laboratories, services and personnel.
3. Designing, evaluating and implementing new methodologies
4. Developing and monitoring a Quality Assurance System to include:
   a. Quality Control of Services

b. Competence Assurance of Personnel

5. Promoting an awareness and understanding of the profession to laboratory personnel, related professions and to the consumer/public.

LEVELS OF PRACTICE

To assure the quality of patient care, laboratory personnel must be competent and must be able to demonstrate their competence periodically. In addition, they should perform only within their scope of competence. Therefore, ASMT recognizes that specific criteria must be used to identify and describe the performance roles at several levels of responsibility (Levels of Practice) which ought to exist in the clinical laboratory.

At this time, there are four major types of services which are necessary to assure high quality performance in a clinical laboratory: 1) Physician/Patient (Medical); 2) Scientific/Technical; 3) Supervisory/Administrative and 4) Educational. Briefly, the four services are described as follows:

- Physician/Patient (Medical) Services include patient diagnosis and treatment based on the interpretation of test results in the light of patient history and physical findings.
- Scientific/Technical Services include the production of test data, the monitoring of the accuracy and precision of test results, the correlation and interpretation of test data, and the development of analytical procedures.
- Supervisory/Administrative Services include managing laboratory operations (technical, fiscal, work flow and personnel.)
- Educational Services include the establishment and management of educational programs for students and laboratory personnel.

Each of these services is important to the successful operation of the clinical laboratory. The major difference between them lies in the education and experience needed by the staff which provides them. It should be noted that while the services described above are distinct, one individual can and often does provide more than one type of service and thereby can be performing at different levels of practice, eg S/T Level IV, S/A Level II, E Level III.

The purpose of this paper is to discuss ASMT's philosophy regarding the Levels of Practice in the Scientific/Technical, Supervisory/Administrative and Educational Services only. Four levels are identified in the Scientific/Technical Service, two levels in the Supervisory/Administrative Service and four levels in the Educational Service. Within any one service, the Roman numerals used to designate the levels are not equivalent in terms of education/experience to the levels in any other service. (eg Level I Scientific/Technical is not equivalent to Level I Supervisory/Administrative in terms of education/experience.)

The Body of Knowledge within the Clinical Laboratory Sciences Professions encompasses the Scientific/Technical, Supervisory/Administrative and Educational Services. Within the Scientific/Technical, the Body of Knowledge contains:

1. clinical application of principles from certain existing academic-based disciplines, such as Microbiology and Chemistry, combined with theories and techniques unique to Clinical Microbiology and Clinical Chemistry;
2. principles unique to the clinical laboratory sciences such as Hematology, Histology, Immunohematology, Urinalysis, Hemostasis, etc;
3. information specifically related to laboratory testing and quality assurance; and
4. specialized knowledge of clinical correlation which relates laboratory test data to human physiology.

While the Body of Knowledge for the Clinical Laboratory Sciences contains some information which involves the application of knowledge from existing disciplines, the vast majority of information within the Clinical Laboratory Sciences profession is unique to the profession.

Scientific/Technical Service

Within the Scientific/Technical service, there are two types of laboratory personnel, the Generalist and the Specialist, operating at various levels of responsibility. The levels and their corresponding competencies are described below:

S/T Level I personnel should be able to:

- perform all of the repetitive (high volume) tests in a modern clinical laboratory;
- identify direct causes (technical or instrumental) of problems and make simple corrections by using pre-set strategies;
- use and monitor quality control procedures within predetermined parameters.

S/T Level II personnel should be able to:

- perform all functions of Level I Scientific/Technical Services;
- perform analyses which require a complex network of steps and variables;
- recognize a problem, identify the cause (technical, instrumental or physiological), synthesize alternatives and determine solutions where no pre-set criteria are available;
- confirm and verify results by having an in-depth knowledge of techniques, principles and instruments;
- correlate and interpret laboratory data based on knowledge of physiological conditions affecting test results;
- establish and monitor quality assurance programs.

S/T Level III personnel should be able to:

- perform all functions of Level II within their specialty;
- design, evaluate and implement new methods.

S/T Level IV personnel should be able to:

- perform all functions of Level III within their specialty.
- critically analyze patient data to formulate a hypothesis and be

able to suggest a logical protocol for the physician to follow in confirming the diagnosis of a patient.

Supervisory/Administrative Service

S/A Level I personnel should be able to:

- perform all functions within Level III of the Scientific/Technical Service as a Generalist or Specialist;
- participate in the establishment of a system that ensures the reliability of tests performed in accordance with established standards;
- implement and monitor such systems;
- assist in the preparation of and monitor staffing schedules to provide coverage and effective utilization of personnel;
- supervise and evaluate the performance of personnel and monitor work flow;
- provide technical instructions and training of personnel;
- assist in preparation of budget;
- assist in selection of supplies and equipment and monitor their use;
- develop appropriate documents and manuals to ensure proper performance of tests.

S/A Level II personnel should be able to:

- coordinate all functions of Level I Supervisory/Administrative Service;
- design, establish and evaluate an ongoing personnel selection, orientation and development program to meet the needs and scope of the laboratory services;
- establish and implement a laboratory safety program;
- assist in determination of educational needs of laboratory staff;
- determine, establish and evaluate a financial management plan in accordance with policies and procedures of the institution;
- develop and implement a system for productivity evaluation, work measurement and daily staffing needs;
- establish and maintain an appropriate public relations image for the laboratory;
- develop goals and objectives for the clinical laboratory;
- develop and implement operating policies and procedures in accordance with institutional policies and rules of all regulatory agencies;
- justify fiscal needs internally to institution and externally to state review committees;
- develop and implement a system of peer review of laboratory services;
- represent laboratory in interactions with other departments and members of health care team.

Educational Service

E Level I personnel should be able to:

- perform all functions within Level II of the Scientific/Technical Service as a Generalist or Specialist;
- demonstrate tasks to be performed by the learner;
- contribute to the design, implementation and evaluation of the clinical practice experience.

E Level II personnel should be able to:

- perform all functions of Level I Educational Service within their specialty;
- design, implement and evaluate one or more courses in the clinical laboratory sciences. Implementation includes the presentation of theoretical information through didactic sessions and presentation of practical information through demonstration and laboratory practice;
- evaluate student's theoretical knowledge and practical abilities.

E Level III personnel should be able to:

- perform all functions of Level II Educational Service within their specialty;
- develop and implement program philosophy;
- design, implement and evaluate a generalist, specialist or continuing education program in the clinical laboratory sciences;
- coordinate program goals, objectives and policies with affiliated academic institutions;
- coordinate learning experience within the clinical environment;
- supervise instructing personnel.

E Level IV personnel should be able to:

- perform all functions of Level III Educational Service, but may no longer perform the duties of Level I or II of Educational Service;
- administer program to meet accrediting specifications;
- develop and maintain desirable relationship/affiliation with other programs and institutions;
- monitor job market requirements in order to update curriculum;
- secure and manage the resources (facilities and funding) for the operation of the program.

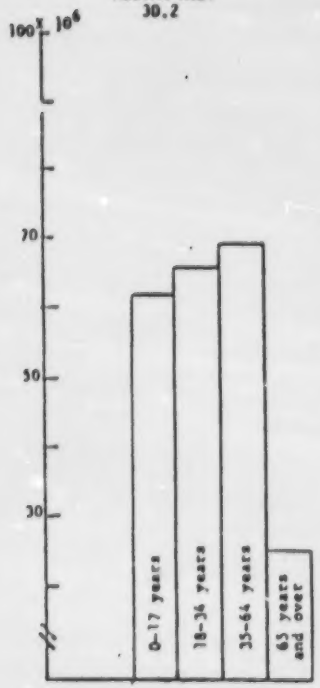
The Levels of Practice for the Clinical Laboratory Sciences profession are the reference points of the ASMT Competence Assurance System. These levels will determine the educational and professional evaluation mechanisms required to make this System effective and efficient.

The Competence Assurance System will provide laboratory personnel with opportunities for progression. In identifying the Levels of Practice, relationships in a career line can be clearly defined, allowing individuals to move vertically to the highest level of their capabilities and laterally to related fields of endeavor.

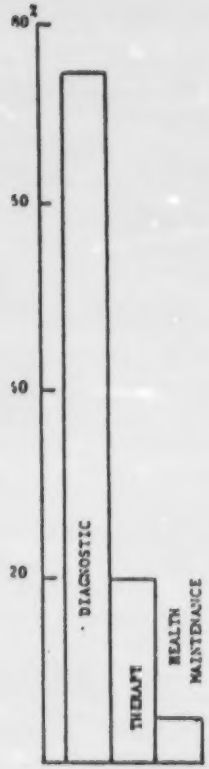
As the demand for and the complexity of laboratory services continues to increase, the Levels of Practice with the corresponding competencies will continue to evolve. Using input from all laboratory professionals, as well as other professional organizations, ASMT will continually monitor and update the Levels of Practice to reflect the changing and expanding roles within the scope of the Clinical Laboratory Sciences profession. This dynamic process ensures the quality of laboratory services that are essential to the best interests of public health. ■

YEAR 1980

UNITED STATES POPULATION

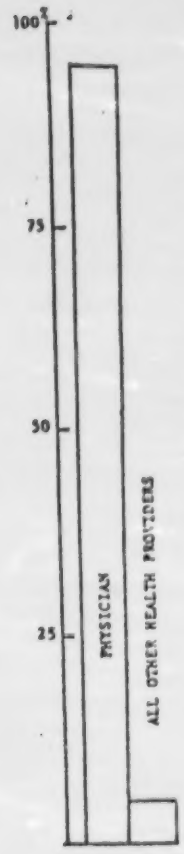


LABORATORY FUNCTION

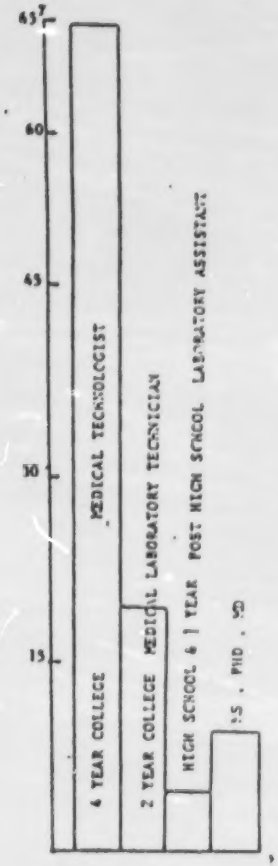


LABORATORY ACTIVITY

LABORATORY RESPONDS TO:



LABORATORY STAFF



SUGGESTED AREAS OF LEARNING

High School

English Composition
- Listening
- Reading

Mathematics
- Algebra
- Trigonometry
- Graphing

Typing
General Chemistry
General Biology
General Physics
Ethics
Team Concepts
Interpersonal Relationships
Social Organization

Intro. to:
- Hematology
- Urinalysis
- Chemical Chemistry
- Microbiology
- Laboratory Safety
- Patient Safety

2 Year College

English Composition
Mathematics
- Algebra
- Trigonometry
- Statistics & Graphing

Typing
Chemistry
- Inorganic
- Organic

Physiology
Anatomy
General Biology
- Genetics

Ethics
Team Concepts
Interpersonal Relationships
Psychology

Principles of:
- Hematology
- Urinalysis
- Clinical Chemistry
- Microbiology
- Immunology
- Instrumentation and Automation
- Laboratory Safety
- Patient Safety

4 Year College

English Composition
Mathematics
- Algebra
- Trigonometry
- Calculus
- Statistics & Graphing

Typing
Physics
- Thermodynamics
- Optics
- Electricity & Electronics

Chemistry
- Inorganic
- Organic
- Quantitative
- Physical Chemistry

Biology
- General Cellular and Molecular Biology
- Embryology
- Genetics
- General Physiology
- Cell Physiology
- Anatomy
  - Gross
  - Microscopic

Biochemistry
Interpersonal Relationships
Psychology
Ethics
Team Concepts
The Medical Community Organization

Principles & Advanced

Hematology
Hemostasis
Urinalysis
Clinical Biochemistry
Microbiology
- Bacteriology
- Mycology
- Virology

Immunology
Immunohematology
Human Genetics
Medical Nuclear Technology
Theories of Automation and Instrumentation
Research Methods
Management and Supervisory Techniques
Laboratory Safety
Patient Safety

LABORATORY MEDICINE

Marvin Margoshes
Technicon Instruments Corporation

The Arthur D. Little Company estimated last year that health care expenditures in the United States were $250 billion, a ten-fold increase from 1960 expenditures. The same study forecast that health care costs will continue to increase more rapidly than the growth of the total economy, approaching $1000 billion by 1990 taking inflation into account.

Laboratory medicine probably accounts for between 5% and 10% of health care expenditures; it is about 10% of in-hospital costs. Laboratory medicine has grown very rapidly in the last quarter century. The growth was driven largely by the availability of new technology, as is true also for many other areas of medicine. Federal and state health planners tend to focus on the areas of most rapid growth and increased expenditures, and they see the growth as something to be controlled. However, there is good evidence that the proper use of laboratory tests greatly reduces total health costs.

Automation has been one of the major technological factors behind the growth of laboratory medicine. Automated analyses are more reliable and very much less expensive than manual tests, and automated analyses enable the laboratory to return the results to the physician much more rapidly. These important benefits led to greatly increased demand for laboratory tests. As a result, automation in laboratory medicine has not decreased employment. Rather, since the 1950's there have been large increases in laboratory staff. That trend may not continue in the future, and employment may be relatively constant. However, there is no reason to expect significant unemployment in laboratory medicine, so it represents a wise career goal for today's student.

In this document, I seek to identify recent and future developments in laboratory medicine that will affect job opportunities for high school graduates and the skills that will be needed for those positions. The opinions expressed are mine and not necessarily those of my employer. However, I have tried to synthesize the prevailing views of experts in laboratory medicine, as I understand them.

By 1960, laboratory medicine had already started its rapid growth, but it would then have been very difficult to forecast the size of this industry in 1980. Major parts of the field were too new and they were changing too rapidly. The field is more settled now and forecasts can be made up to at least the middle of the 1990's.

Medicine is a relatively conservative field, as it should be. New procedures must be tested thoroughly in research centers and then a large number of physicians and others must be trained in laboratory medicine. For a laboratory procedure to come into common use, laboratory personnel need to be trained and apparatus and supplies must be developed and brought into production. A laboratory test is rarely diagnostic in itself, and physicians must learn how to interpret the result of a new test in the context of the total information he has about that patient. The new procedures that will become popular in the 1990's are already in the research stage.

The Computer

This Committee has already heard much about the role of the computer in health care. The computer will be at least as important in laboratory medicine as in other medical areas. The computer has at least three major roles for the future, and two of these are already well under way. The remaining role, the use of the computer by the physician to assist in interpreting laboratory results, will have the least impact on the laboratory worker.

As testing procedures have become more automated, more of the labor and expense in laboratory medicine has been in paperwork--logging in of samples, monitoring the work flow, reporting the results, and billing the patient or his insurer. Also, as the test methods have become more reliable, errors in the paperwork have become more of a factor. Computer automation of the paperwork can simultaneously reduce costs and reduce errors. For both reasons, laboratory computers are becoming more common.

Computers are also becoming much more common as components of laboratory instruments. Microprocessor-based computers are not very expensive, and it is sometimes even possible to make an instrument less costly with a computer than without one. The computer can be programmed to do multiple tasks, so it can replace several of the more conventional electronic circuits. There is one clinical chemistry analyzer on the market which has a built-in computer that controls the instrument and that is also programmed to handle the general paperwork of the laboratory.

The computer has several impacts on job skills. It eliminates or reduces the routine paperwork in the laboratory that can be done by high school graduates. On the other hand, the computer in the instrument can monitor instrument performance and it can eliminate the need for various adjustments, and these functions reduce the level of skill needed to operate the instrument.

At least for the near future, there will be a premium for laboratory personnel who are comfortable with computers. Some familiarization with computers is highly desirable in a high school course. The technician or laboratory aide is not expected to know how to program a computer, but he or she should know how to operate a keyboard and how a dialogue with a computer is different from a dialogue with a person. (The computer is more literal than a person. Computer languages have few ambiguities of meaning. A language such as English can be quite ambiguous and it can also have many ways to express the same thought. If the command for a computer to start a sequence of operations is RUN, the computer won't accept GO or START. The operator must be accustomed to this.)

Other Technology Trends

There are major technological trends in addition to the computer that will affect laboratory medicine in the future. One that is important for the deliberations of this Committee is the growing reliance of most laboratories on packaged reagents, which reduces the number of semi-skilled jobs to prepare reagents. This is not a new trend, but in the past it has been mainly a matter of convenience and cost that entered into the buy/make decision in each laboratory.

New developments place the preparation of some reagents beyond the capabilities of most laboratories. For example, enzymes are often used as reagents, and the enzyme solutions are expensive and unstable. Enzymes can be chemically attached to solid surfaces, which makes it possible to re-use the same enzyme many times. Also enzymes that are attached to solid supports usually degrade more slowly than the same enzymes in solution. For both reasons, immobilized enzymes are quite useful as reagents, but few laboratories can afford to develop the skills to immobilize enzymes. They must rely on the manufacturers to provide the packaged materials. This reduces the number of job openings in laboratories to prepare reagents.

As the bulk of the work of the laboratory is automated, the areas that have remained manual have been special tests and tests done at night when the instruments are shut down. It has taken a good deal of skill to do these tests and the work load is diversified, so these have not been suitable jobs for high school graduates. The newest generation of instruments are designed to handle at least the common out-of-hours tests. For example, Kodak in Rochester has taken advantage of their skill at incorporating complex chemical reactions in a sheet of film. The

Ektachem slide has in it a complete reagent package for a laboratory test, and it is only necessary to put a drop of blood serum on the slide, incubate it for a few minutes, and measure the color that is developed. Even these simple steps are done by a machine. The effect of this sort of technology is to reduce the level of skill that is needed to do emergency analyses. This could open new job opportunities for the high school graduate.

In the past, chemistry and biology were adequate technical education for the medical laboratory worker. These are still the prime areas for education, but a course in physics is now also desirable. Physical methods of analysis predominate over chemical methods in many industrial applications, and the same or similar physical and physico-chemical methods are coming into clinical chemistry. One example is the use of radioactive tracers in immunoassay (RIA) and to detect the growth of bacteria. Some of the new measurement methods are mainly electrical. For instance, special electrodes have become the preferred method to measure sodium and potassium in body fluids. The measurement can be made on serum or on whole blood with absolutely no chemical preparation of the sample. In the future, it may be possible to measure sodium and potassium continuously on critically ill patients by placing these electrodes in the patient's bloodstream.

Optics is another area of physics that is growing in importance in laboratory medicine. The microscope has always been a vital tool in the laboratory. More sophisticated optical methods are now being introduced, often ones that use the unique properties of light from a laser. The instruments that most laboratories use to count blood cells are based on electrical measurements, but the newest instruments for hematology both count and distinguish the different types of white cells, using sophisticated optical measurements with computers to interpret the optical data.

Other Factors

The three major branches of laboratory medicine are clinical chemistry, hematology, and microbiology. Clinical chemistry has been more influenced than the others by technology. Indeed, it is fair to say that modern clinical chemistry was created by technology, and particularly the technologies of automation. All of laboratory medicine has been affected by increased knowledge in biology and medicine, but there have not always been major changes in the laboratory techniques.

Hematology is less automated than is clinical chemistry. The level of automation in hematology is growing, and it may completely replace many manual operations by 1990. The new instruments that distinguish the different types of white cells have already been mentioned. When automation becomes more widely accepted in hematology, the laboratory will need fewer technicians. At the same time, the skill levels of some new jobs may be within the reach of a high school graduate. Less skill and experience are required to operate an automated instrument than to identify cells through a microscope.

Automated instruments are the exception in microbiology. It has been said that Louis Pasteur would feel at home in a modern microbiology laboratory. That is not entirely true, but it is true that change has been slow with regard to the basic techniques of microbiology. New microbiology methods are emerging from the research laboratory, and some of these are incorporated in commercial instruments. For example, rather than growing bacteria in a petrie dish and counting colonies, the laboratory now may grow them in a broth and measure the rate of their growth by electrical measurements, by light scattering, or by the release of radioactive carbon dioxide.

It is too early to say which of the new technologies in microbiology will be widely adopted. Experts in clinical microbiology differ on how soon the new methods will come into common use. It can be said that the introduction of new technologies in microbiology will reduce the level of skill needed for entry level jobs.

Something should be said also about changes in the sizes of medical laboratories, which has an effect on the numbers and types of jobs. There is a clear trend to larger laboratories in clinical chemistry. Large laboratories can operate more efficiently, and they can offer lower prices for the same tests. The largest laboratory, Metpath, is located in New Jersey. Samples come to them by air from all over the world and even from other countries, and of course they also get many samples from the New York metropolitan area. To give some idea of how large this operation is, they have recently purchased 18 new analyzers, each of which is capable of doing up to 48 tests on each of 300 blood samples every hour. A laboratory of this size takes business away from many smaller laboratories, which also reduces the number of jobs in those laboratories. To the extent that the affected small laboratories are in New York State, the effect is on our graduates who do not want to move away. A few years ago, Metpath wanted to set up a new laboratory in New York City, and they felt that they needed some changes in New

York State regulations to do that. The changes they requested were denied, and Metpath has expanded in New Jersey instead.

Many smaller hospitals are closing for reasons of economy, especially in the large cities. In turn, this means fewer hospital laboratories. At the same time, small satellite laboratories are being set up in some of the large hospitals. There are some laboratory tests that are needed urgently in intensive care units, emergency rooms, and special clinics. When the hospital is large and the laboratory is at some distance from the patient location, it takes too long to carry a sample to the laboratory. Also, the cost of a messenger to carry the sample must be considered. Instrument companies are providing equipment that is well suited to these new satellite laboratories. A few of the instruments can be operated by the nursing staff, but it is the frequent practice to provide the laboratory with a special technician. Many of the new instruments are built with micro-computers, making them "intelligent." They could be operated by high school graduates.

Few laboratory tests are done in physicians' offices or small clinics. There are a few simple tests, such as the dip-stick test for sugar in urine, that are often done by the physician or someone in his office. In general, though, most laboratory procedures call for equipment and skills that are too costly for the physician's office. This may change for the future.

New technologies will make it economical to do more laboratory tests in the physician's office. One of these is the Kodak Ektachem system, where the reagents are "packaged" in a form like a 35mm slide. The Ames Company in Indiana is developing a different method that appears to offer lower cost but may not give quite as precise answers. The Ames approach resembles the familiar dip-stick for sugar in urine, but it is more sophisticated.

It is not certain that the trend will develop to do more laboratory tests in the doctor's office. If it does, individuals who work in those offices will need training in some basic laboratory operations.

The trends that I've mentioned to consolidate laboratories and to establish specialized laboratories in clinics and doctor's offices are so far specific to clinical chemistry. Hematology and microbiology still rely more on skilled technologists than on instruments, and these areas of laboratory medicine are not as influenced by these trends. New technical developments may change that in time, but not in the near future.

Some Nontechnical Factors

Nontechnical factors are very important in the future evolution of laboratory medicine, but it is harder for me to predict when and how the changes will take place.

Laboratory medicine is highly regulated, and these regulations include requirements for training and certification of the laboratory staff at various levels. The trend has been to require more education and training, making it more difficult to move from high school into a laboratory job.

Political and economic factors combine to promote the consolidation of laboratories into fewer and larger operations. Federal, state, and city governments each play a part in the closing of smaller hospitals. The larger commercial laboratories can offer lower prices, as was already mentioned. The government agencies that pay health costs tend to fix their reimbursements at the fees charged by the most efficient laboratories, which makes it hard for the smaller laboratories.

Regulatory factors may also affect the performance of tests in the doctor's office. In the U.S. and most other countries, there is little or no regulation of the way tests are done in doctors' offices. In part, the lack of regulation reflects the small amount of testing that is done. If office testing does become common, regulation will almost certainly follow. Doctors in France are already required to have special certification if they do office testing, and similar certifications or proficiency tests are being introduced in some other countries. The cost of meeting the requirements may outweigh the advantages to the patient and the physician from office testing. It is much too early to say how the regulations will affect office testing, but it is something to be watched.

Laboratory Work Requires Strict Attention to Detail

Those who have addressed this Committee brfore me have mentioned some key skills that are needed by an individual who is to work in the health professions. Some of their recommendations were summarized in the material that was sent to me about the previous Committee sessions. I would add that the laboratory worker must be especially meticulous.

The laboratory worker must follow prescribed procedures at all times, without exception. A laboratory director will usually welcome suggestions for improved procedures. He cannot tolerate employees who take it on themselves to change the

procedure in even the smallest detail without permission.

A step in a procedure that appears to be minor may actually be critical to the results, and it takes a great deal of training and experience to recognize this. A particular step in a procedure may be required by law or regulation, and the laboratory worker may not know it. A part of the procedure may seem to be useless or inefficient unless one can see it in the context of other procedures in the laboratory.

I don't know whether a student can be taught to be meticulous or if it is an innate characteristic. Students who want to study laboratory technology should be chosen for this trait or educated to develop it. If the student cannot or will not follow the prescribed procedures exactly, he or she will not be satisfied to work in a medical laboratory and will have difficulty holding a job.

COMPETENCY-BASED VOCATIONAL EDUCATION

Joseph J. Messier

Bureau of Occupational Education Program Development
New York State Education Department

Competency-based education is occupational education; occupational education is competency-based. In occupational education it is not enough that the student "appreciate" how a burn dressing is applied, or "understand" how metal is welded. The student of occupational education must be able to do--to perform--to the minimum standards acceptable to industry--and that is the definition of "competency."

First let's consider the noncompetency based system of education.

1. Program and course content is determined, often on a basis of what is nice to know (what isn't nice to know?) or even on a basis of pseudo-intellectual status building--or even on a basis of what the teacher likes to teach. Remember the old idea of "transfer of training" when everyone gaining a classical education studied Greek on the theory that the study of Greek helped train the mind to study all else? (I never could find out what the Greeks studied as such a catalyst to other learning! English maybe?)
2. Instruction is presented by one method, to a group of students, in a set amount of "teaching" time. Instruction inexorably continued in order to "cover the year's work" while those who did not master the lesson content restudied as best they could with whatever the teacher could manage to give.
3. Learning is tested, and achievement reported, as a percentage or letter grade, usually based not on what the student must know, but on an average achievement. Students do not know in advance what level of achievement will be needed to obtain an "A" or "B"--"mastery"--may not be competent in some vital area. A standard passing grade of 65% always caused me to wonder which 35% of the subject matter really wasn't that important; and if it wasn't that important why was the student's time and effort being wasted in instruction upon it? And believe me--no health occupations person whom I know to be only 65%, or 75%, or 85% competent is going to get anywhere near my one and only body! That student may not know everything there is to know

about being a nurses aide, a practical nurse or whatever the title may be but I want that student to be 100% competent in those things he or she is assigned to do.

So let's look at that system which is so natural to occupational education--competency-based vocational education, or CBVE.

1. The knowledge, skills, and yes, attitudes, which a beginning worker must possess are determined by a job analysis; an analysis compiled by new workers and their immediate supervisors, not by teachers 20 years out of the occupation like the one addressing you today.
2. After the knowledge, skills, and attitudes are determined, occupational educators with ability in curriculum development assist those who teach that occupation to write the curriculum, for curriculum development is just as much a specialty in education as is any specialty in medicine. The first step is to write Terminal Performance Objectives for each necessary task. Terminal, here, means that at the end of the student's study of the task the student will be able to perform the described activity, under the stated conditions of performance, to the clearly delineated level of proficiency. The task should be clearly described; the conditions are necessary if we are to evaluate competency since the ability to give a certain type of first aid in the clinic or in a crowded, hectic emergency room, or at an accident scene will vary; and the level of proficiency must be stated since that is what establishes the competency.

In CBVE instruction initially may be by group, but rapidly becomes individualized as each student's unique ability to perform a given task begins to diversify the tasks being learned at any time. Instructional methodology is selected to conform with the individual student's cognitive style. This means, of course that the teacher must study each student to determine that student's cognitive style or best means of learning. As you know, some people learn best from reading, some from listening, some from audiovisual aids, and some from just getting in there and doing it.

Testing occurs when the student feels he or she has obtained competency in the task. The test is criterion-referenced, that is, it conforms exactly to those criteria stated in the Terminal Performance Objective, with which the student was aquainted at the beginning of the task. If the Terminal Performance Objective said that the student will make an unoccupied hospital bed, then the student must make

an unoccupied bed, to minimum standards of the institution, as a test of competency. Describing how the bed is made will not suffice. If the TPO is to list the cardinal visible symptoms of a person going into shock then the instruction must clearly identify those cardinal visible symptoms, and the test will be to list them--without error of commission or ommission. Again, a percentage of accuracy is meaningless as a measure for competency for the symptom which the student failed to learn may be just the one which gets a patient into trouble.

The psychomotor domain! Those observable activities. These are evaluated by teacher observation of the performance and measurement of any product. For example, determining oral temperature. The instructor not only observes the performance for the necessary and proper approach to the patient, handling of equipment, and so forth, but by taking the patient's temperature on a matched thermometer the student's measurement can be evaluated.

The cognitive domain can be evaluated by paper and pencil tests, or by teacher observation of the student's exercise of choice and judgement. The affective domain--that of attitudes--is trickier. May Mager forgive me, but I contend that a person's attitude is not measurable. An excellent example is one by Popham. The objective was that a student of music appreciation would show appreciation of classical music by attending six concerts during the semester. The student did attend six concerts. But only because he was trying to make the redhead on clarinet. He really couldn't stand classical music. His attitude was not really measured. What we are really interested in is the manifistation of "proper attitude" in the form of the student's behavior. The nurse's aide may feel that patient X is the biggest pain in the posterior ever to enter the doorway, but if that aide is always considerate, cheerful, helpful, and all of the other proper attitudinal behaviors when in that patient's presence, then the aide is considered to have the correct attitude.

Evaluation of the student is expressed as "Competent" or "Not Yet Competent." The Competent student proceeds to the next task to be mastered; the Not Yet Competent student restudies the task--with different methods being used--until competency in that task is achieved, or until it becomes apparent that competency in that task is beyond the ability of that student. Naturally, a variety of tests must be available to students who require repeat testing, so that we prove they've mastered the task not the test. All tests, however, must be criterion-referenced. CBVE then has these characteristics:

1. Objectives are stated in terms of student behavior--observable and measurable behavior.
2. The level of proficiency/standard of quality of the process/product are clearly and exactly described.
3. Conditions under which the task will be performed are stated.
4. The student is made aware of exactly what must be done, under what conditions, to what level of proficiency BEFORE study is begun.
5. Assessment of competency is always in terms of the criteria stated in the objective. A superiority of performance is never inferred.
6. Accountability for meeting the criteria, that is, attaining competency, is placed on the student. While the teacher may suggest that the student seems ready for the test, or not yet ready, it is the student who decides when the test should be administered.

Experiments by Block in 1971 and Bloom in 1976 indicate that 75% to 95% of students can achieve mastery of most instructional content by use of this method. This becomes impressive when compared to 25% mastery by traditional instruction.

In developing a competency-based curriculum the skills and knowledges on which a student will be judged must be those which the entry worker must perform in employment, so step number 1 is always the job analysis. For teaching convenience similar tasks may be gathered into units or modules. The similarity may be the actual sequence of perfromance on the job, a similarity of psychomotor activities, or a common theoretical base. It is important to remember that the task is the nucleus of our teaching, that modules and units merely organize those tasks for teaching convenience.

Second, a good Terminal Performance Objective must be written for each task.

Third, student records or a pretest should indicate whether the student possesses prerequisite skill and knowledge (you can't teach reading a thermometer if the student has no understanding of decimals). It won't go for the student to say the temperature is "96 and three of those little marks." So a bit of remedial teaching may be necessary for the student to meet the enabling objective, a cognitive objective, of being able to read "those little lines" in between the

numbers on the themometer.

Fourth, instruction is given, with considerable attention to selecting methods optimum for the individual student's cognitive style. Alternate methods should be in reserve.

Fifth, the student practices until he or she feels capable of acceptable performance. The student then requests testing.

Sixth, the student is evaluated by performing or by describing--either achieving competency or restudying.

A profile of tasks in which a student has attained competency is kept. Some students will be competent entry-workers in several job titles of an occupational area; some in only one job title--but all have successfully completed the program if employable.

If you must provide a letter grade or a percentage grade to a home school, you can distribut "A" or 90%, or "C" or 70% based on the number of job titles within the occupational area in which the student has attained competency in the required tasks--although conversion of the home school to the more meaningful competency-based system is preferable.

At first a system of competency-based education may seem complicated and difficult, but if you study the system a little I believe you will find that it is a "natural" for occupational educators, since our objectives are always the performance of some activity--although each activity requires knowledge to be correctly performed. Once the initial job of determining the necessary tasks, and writing the objectives, has been accomplished the testing is almost self-evident. The teacher finds that there is more time for individual instruction, more time for teaching, and that teaching is more effective. Competency-based vocational education. I recommend it highly. As an old commercial used to say, "Try it, you'll like it."

CONTENT BASED CURRICULUM

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It is always interesting to be asked to do the impossible and a fascinating journey is undertaken as curiosity prompts us to attain possibilities.

"A man's education begins one hundred and fifty years before he is born...." Oliver Wendell Holmes. If you agree with Holmes then you accept that what we do here today will have an effect on a task force meeting in the year twenty-one thirty-one.

Presentations on currriculum usually focus on the development of theories from the past and identify application to the present. Since the purpose of this task force is to identify the future frame of health production and identify the educational foundations to be set in place today to support that frame structure, a review of experts such as Dewey and Thorndike and in the profession of nursing; Goodrich or Driscoll will not be done. I would share with you my projections for the immediate future and the changing design of curriculum in nursing to support maintenance of health in the international/interplanetary world that has become as real for us as the opening of the West was to proper Bostonians in the beginning of the eighteen hundreds.

In the next few years I see Industry becoming the University of the World. Emphasis on Prevention and Teaching will change the process of service. Short term technologies will be taught in short term courses. Communication systems will allow inservice programs to be made available nationally and to a vast majority at the same time expediting the time lag between developmental stages of a technology. Nursing theory plus methods of applying that theory will be available to all people in a community. In the next few years I see nursing content courses opened to all who wish to be enrolled. National nursing education will be a reality for all combining the needs of parenting emergency medical technicians, caretakers of elderly or handicapped in the home, etc. Nursing laboratories in high schools and colleges would be available for any individual who needs to master a particular nursing technique. I see this as a major support to two emerging areas of need: preparation of our people for action in national emergency and enhancement of the individual's frame of reference to accept preventive principles that are the foundation of the delivery of care today.

The mystery surrounding the superb machine that is the human body will be solved by introduction of anatomy and physiology courses at an early age and available even at home through cassettes such as Radio Shack's Apple System. Hospitals will be primarily for the care of the critical - life maintenance - rehabilitation segment of care.

All hospital budgets for nursing will be seperate and distinct. Nurses will not do hotel/housekeeping/business management chores. Mildred Schmidt, Executive Secretary of the Board for Nursing suggests that outside nursing corporations will be developed and bid for supply of nursing to hospitals or nursing homes.

There will be municipal nursing teams to help caretakers in the home. It is conceivable that nurses will make the same adaptations to caring for numerous families in the community as did the Henry Street Nurses who took to traveling across roof tops of New York City ghettos because the poorest families lived on the top floors.

There will be municipal mobile units set up especially in rural communities that can bring nurses to the patient for minor surgery, pharmacological support, and support in physiological and psychological stress.

The content to be selected for the development of the individual practitioner will, in my opinion, be one that seperates theoretical development from clinical development. This does not mean a return to apprenticeship or craft approach but a recognition that units of nursing that were traditionally inclided in a general content area have developed into a process with a definitive specialized theory and clinical education component that stands not in the foundation but on it.

I recommend for your reading an article by Barbara J. Stevens, R.N., Ph. D. Clinical Education of Nurse Students: An Overlooked Element. The Dean's List, Vol. 2, No. 1, February 1981.

Carl Rogers, "Personal Thoughts on Teaching and Learning" takes the position that, "the only kind of learning which significantly influences behavior is self-discovered or self-appropriated learning truth that has been personally appropriated and assimilated in experience."

A model that might be used for introduction of content to develop the career could be the Secondary Health Occupations Education designed by the Arizona Department of Education. I would see the health careers cluster as an introduction to community survival and health courses for prevention of illness and understanding the health needs of teenagers. For example, these youngsters are beginning drivers of automobiles and following Roger's position, they could be

stimulated to understand and adapt to emergency care, accident prevention, etc.

The twelfth grade area would be a content area to explore theories of nursing and an introduction through a buddy system to the care situation. If you want to be a nurse - see what a nurse does. Follow one around for a day - week, etc; there would also be an adaptation to the environment and an introduction to the language and commincation system of health delivery systems. These areas would enhance the opportunities for individuals who wish to develop competencies of caring in non traditional systems. For example, the Army Reserve units now offer programs for their members to achieve an LPN education in the civilian schools of nursing while continuing with Reserve obligations and functions.

Nursing is now becoming so distinct an activity that there is no question about a "question of identity" except those wisps of fog that still remain from images of the past. Like all fog, a little heat from the sun will make it dissapear.

The sunshine, in my opinion, is the content selected to develop the practitioners in nursing.

My magic wand would have all potential health care providers begin with a high school or prep program that is strong in the liberal arts area and includes an introduction to math and science. The preparation for all health professionals who select patient contact areas for work would be basic nursing. From there they would move to X-ray, medicine, etc.

Basic education would stimulate intellectual curiosity that would allow the individual to keep a path through the forest that had culture in one side and career on the other.

Literature courses that would allow development of one's attitude toward mankind would be part of all health care courses. "A Sinclair Lewis looks at a small, average American town and sees only its drabness and petty limitation and writes Main Street." A Thornton Wilder looks at a similar town. Life in his town, young love, adult fear and hope, marriage best or worse, becomes an epic of humanity in the poetry of Our Town.

The person becomes the nurse or health provider. Content in providing the process of developing into a care person is the prime ingredient needed for now and the future.

Content selected by teachers is evidence of the definition of learning that is meaningful and useful to them in their professional activities. That definition is translated into the content and clinical applicaations designed for students (see attached draft).

As I stated in the introduction, content and competency are intertwinable, interchangeable, and interexasperating. When one talks about content and competency as defined by Daniel Coleman in Psychology Today, January 1981, "The New Competency Tests: Matching the Right People to the Right Jobs," could be applied to faculty selecting the content. "Competencies are defined not as aspects of a given job, but as special characteristics of the people who do the job best."

Faculty who do the job best select a nursing theory and then identify content and instructional methods that will allow the learner to perceive the meaning and application of that theory. In addition, the application will take place in a real life patient care situation that rarely mirrors the laboratory environment.

Development of the individual's competencies that will allow survival during this difficult process of transfer of learning is an imperative content unit. An educational world of absolute (e.g., competency based education) that makes no allowance for exceptions would be misleading as a theory approach. The world of nursing doesn't work that way.

The definition of what a nurse does will be the foundation of an essential relationship between education and work. What is the financial base available? What are the socital needs for this year? Who can best do this activity? Rapid, computer supported research and study done on the questions, mass communication to delivery teams with the answers and hopefully continued progress in developing a neophyte nurse that pleases herself and her employer.

Technical nursing is coming of age in the 80's and I see professional nursing moving toward the post baccalaureate degree area.

Community health personnel will be designed to meet the composite needs of a communtiy. In one area it may be an all volunteer organization, in another, a municipal delivery system.

Alvin Toffler in The Psychology of the Future, "The Role of the Future of Education;" a significant part of education must be seen as the process by which we enlarge, enrich, and improve the individual's image of the future. Process appears to be a framework of education. As a concept, a system, characterized by its constant movement forward in response to an ever changing environment.

Content based education in my opinion is taproot to the development of competencies, process or whatever catch word is in favor to describe what it is we do.

One of the possibilities I arrived at in my exploration is that there is competent content now that will be incompetent content in the future and at this

time in place in nursing we are just beginning the research and study needed to distinguish between them.

We are very much like travelers who are departing hastily for a new country, who have to go through a quick sifting of goods and ask which ones will stand us in best stead for a far journey.

The process of sifting is selection of content that allows the nursing student to adapt nursing process in a kaleidoscope of environments. I see this process developing from one of the goods we have brought with us from the 1950's. In The Art of Teaching, Highet desrcibes student teacher interaction as "togetherness"; viewing the student and teacher as partners in learning and teaching.

As partners we must learn to listen to one another, honor one another's opinions and critiques of our work and constantly move together to make the journey easier for those who follow.

Between the 1800's and 1900's nursing has moved from mantles to miniskirts and now we are designing space suits for our planetary nurses. During all the random changes that have taken place in that time, two areas of content have not changed. The content to continue areas to deepen intellectual curiosity and content to introduce and develop a respect and care for our fellow humans. I am certain that those two content areas will be discussed at the Task Force meeting in 2131 as two essential ingredients needed to support nuclear nursing in a universal world.

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THE USE OF COMPUTERS IN INSTRUCTION

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This paper will discuss some of the ways in which computers can be used in instruction. These uses will not be specific to any one area but will be generalized to a number of different fields. An attempt will be made to use examples from a variety of areas so that the reader may see how these would apply to content in any field.

A brief overview of the history of computers in education will be provided followed by a description of the two major categories by which computers may be used to support the instructional process. Within these a number of instructional strategies will be identified of different ways in which the computer can be used for instruction.

HISTORY

The use of machines for the instructions of students received a great deal of attention during the middle 1950's. Skinner (1954) advocated the use of teaching machines to instruct students. The movement stimulated by Skinner came to be known as programmed instruction and raised a good deal of interest in the early 1960's. Programmed instruction is still widely employed in a variety of contexts, especially the armed forces, and in industrial and training applications.

In the early 1960's computers became more generally available than they had been previously. Most large businesses, universities, and school systems employed computers to handle large scale administration, bookkeeping and analysis of research data. At this time computer scientists and educators began to speculate regarding the use of computers for instruction. This interest received enormous impetus from the development of "time sharing" computer systems in which a large number of users could be working on the same machine simultaneously, studying different subjects, or employing the machine for mathematical and statistical analyses at the same time. Time sharing offered an avenue by which the high cost of computers, at that time, could be reduced by the simultaneous use of the same central processing equipment, thereby bringing down the costs per user.

Many of the early uses of computers, naturally enough, adapted programs developed for teaching machines and other programmed instructional uses to computers. Borrowing the material in this manner provided software at relatively modest costs. Simultaneously, however, it generated two problems: 1) Many of the applications were not especially imaginative. 2) It presented a false image that the programs for presenting the content to students, commonly called courseware, could be rapidly and cheaply prepared.

A renewed interest in using computers for the support of instruction has occurred in the late 70's and continues until the present. This interest was stimulated by the wide availability of microcomputers. These machines are having an enormous impact on all aspects of our society. In general a microcomputer can be purchased in 1981 for under $1,000 which has the calculating capacity of systems amounting up to millions of dollars in the 50's and 60's. The processing capacities of microcomputers differ little from the large machines of that era, though the type of peripheral equipment hooked to those machines differ substantially. That is, microcomputers generally do not have high speed printers, large discs and magnetic tape drives associated with the large equipment. This ancillary equipment is, of course, also available at much reduced cost, but typically is not a part of present microcomputer systems. The development of microcomputers ushered in the possibility of having a computer in most homes and introducing a variety of these in most schools, much the way calculating equipment was available in a prior era.

The availability of microcomputers makes a good deal of computational capacity readily available to schools for their students. It should be noted, however, that this processing capacity is useful for instructional purposes only if adequate courseware is also available. There are two important limitations to the availability of adequate courseware for microcomputers: the need for extra storage, and the cost of preparing instructional materials.

Need for Storage

The instructional material presented to students, or courseware, are generally much too large to store in the computer's memory. Instead, courseware is usually stored on ancillary equipment such as discs or magnetic tapes. The amount of instructional material actually presented to each student generally takes up less than one-tenth of the total space required for the program which presents the instructional material to students. Microcomputers are typically limited with respect to ancillary storage capacity. "Floppy discs," roughly analogous to 45 rpm records and magnetic tapes directly analogous to tape used in cassette recorders,

are often used for ancillary storage of programs and data in microcomputers. Ancillary storage is also required in order to record the students' responses to the instructional material, and subsequently process it in order to give students adequate feedback regarding their mastery of the material. Most instructional applications of microcomputers, then, would require a system with a minimum of two floppy discs in order to handle these requirements. Such equipment raises the modest cost of microcomputers by 100% of the purchase price of the system.

It is also possible to use microcomputers for instruction while, at the same time, connecting these in some manner with larger computers which have a wider choice of courseware and sophisticated capacity to analyze student responses and achievement. Such connections may typically be made by telephone to a large computer system. Using computers in such a configuration requires special connecting equipment, which can be inexpensively acquired. In addition, however, such uses require the availability of some sophisticated computer hardware and software specialists who can assure that the articulation of separate units proceeds smoothly.

Courseware

It had been estimated that anywhere from 50 to 300 hours of programming is required in order to generate one hour of instructional material for student use. The development of adequate courseware represents the largest cost and most important drawback to the uses of computers for instruction. It is rare that educational or financial organization can easily allocate the resources demanded for the preparation of adequate instructional material. It is not at all difficult to generate exciting and imaginative instructional programs presenting an instructional prototype. Developing as much as a year's instructional content, however, requires an allocation of substantial resources to such an effort. Not only are computer programmers required who would actually encode the content into computer programs, but content specialists, instructional designers, and master teachers are also required who would prepare instructional content which reflects the best thinking in the discipline, the most imaginative instructional strategies, and the most sophisticated uses of the computing capacities available. It might be added that such talents are much more expensive than is the acquisition of courseware, and that they are required for extended periods of time.

Summary

The preceding section has offered a brief overview of the applications of machines to instruction, from teaching machines to computers. Computers persist in offering enormous versatility for the presentation of instructional material to

students. Simultaneously, however, important problems in the development of software to enable students to interact easily with this versatile processing equipment still present an important unsolved problem before computers can be easily and cheaply employed for the support of student instruction.

COMPUTER BASED INSTRUCTIONAL SYSTEMS

There are two large categories by which instructional material may be displayed to students: Computer assisted instruction (CAI) and computer managed instruction (CMI). In CAI the student is actually taught on a terminal connected to the computer. The section below summarizes a number of CAI instructional strategies. In CMI students receive instruction in a variety of modes away from the machine and use the machine for periodic evaluation of instruction and in order to receive directions regarding the next step in the instructional sequence. Both types of systems are used at a variety of installations throughout United States and, indeed, the rest of the world. It is probably accurate to indicate that at present CMI systems are more prevalent throughout the world than CAI systems since the resources required for the implementation of such systems are much more modest than those needed for the development of CAI systems.

COMPUTER ASSISTED INSTRUCTION

The large scale use of CAI is probably only a little less than 15 years old. That period has seen the development of many CAI systems. Experience with the use of computers for instruction has indicated that there are a number of different modes for the development of CAI materials. Each of these modes will be discussed below with examples regarding their appropriate implementation.

Drill and Practice

In this mode the underlying concept and generalizations regarding a particular body of content are taught in some manner away from the machine. The machine is used exclusively to provide drill and practice to students of generalizations that they have learned in some other mode. That is, the drill and practice mode assumes that students have some understanding of principles and requires a good deal of practice in order to assure that the general understanding has led to solid mastery of specific applications of the generalizations.

An example from the area of arithmetic calculations may be helpful. Drill and

practice CAI materials developed at Stanford University in California were used in states as far east as Kentucky and Mississippi to teach students mathematics. A similar set of instructional materials was used in N.Y. City. The Stanford materials assumed that students received instruction in the rules governing arithmetic calculations in the classroom. In order to provide practice to assure that students had adequate mastery of these rules students received about 10 minutes of drill and practice daily on a computer terminal. Students could, for example, receive practice with any of the arithmetic fundamentals, such as addition, subtraction, multiplication and division on a machine. The computer would generate a set of unique problems for each student, asking students to calculate the answer, check on the accuracy of the answer and immediately inform the students as to whether they were right or wrong. Exercises at varying levels of difficulties were provided; that is, for example, students might initially receive examples of one digit addition without requiring "carrying." As students continued to work on the system they were assigned more complex content and also more complex operations. That is, they would be advanced from addition to subtraction, multiplication and ultimately division.

Teachers would be informed regarding the achievement of their students on periodic printouts. In this manner the laborious chore of monitoring the practice of each student could be rapidly and conveniently accomplished on the computer, leaving the teacher free to emphasize more fundamental generalizations.

In the area of arithmetic the computer can determine the exact answer to problems by calculating results internally. That is, each problem was generated by using random digits, for example, 4+5. The computer could then internally add the two digits, calculate the correct answer and compare it to that supplied by the student. Using the computer for drill and practice in areas such as symbols in chemistry, dates in history, or related subjects requires that the content of each question be programmed in advance, the correct answer supplied, and the student response compared to the pre-stored answer. In such uses the computer's calculating capacity is used only in comparing the pre-stored answer to the student response. In arithmetic, however, the machine can actually calculate the correct answer, therefore, the digits to be used in a problem and the correct answer do not have to be supplied in advance.

Mathematics is perhaps the only subject requiring the storage of little content other than the basic ten digits, and the four operators, addition, subtraction, multiplication and division. After that most advanced content can be developed

from these fundamentals. In most other areas of knowledge both the content and the operations to be performed on it, and the correct answer from these operations have to be prestored. Such programming, then, requires much more storage space, and a much higher degree of anticipation regarding the types of student responses to be required than is the case in arithmetic.

An example of a student-computer interaction in the drill and practice mode appears in Table 1.

Tutorial Mode

In the tutorial mode all of the instruction is delivered via CAI. That is, unlike drill and practice students receive both instruction in the principles of the subject discipline and practice in it. In this mode the aim of the computer system is "to take over the main responsibility for developing skill in the use of concepts" (Suppes, 1967; p. 16).

In the tutorial mode an attempt is made to imitate a student working in a one-to-one relationship with a live tutor, even though there are many differences between the tutor-student relationship and the tutorial CAI mode. The major difference is the fact that when a student and a human tutor interact the form, or vocabulary used, are completely free; that is both the student and tutor can express themselves in any way that they wish and still be understood. For instance, when a student is asked by the CAI system who was the US president during the Civil War, "Lincoln" is, of course, the correct answer. With a tutor a student could reply, "President Lincoln," "Lincoln," or he might even say "Honest Abe," and the tutor would understand that each of these were equivalent correct expressions. The computer, however, would not recognize the equivalence of these expressions unless it had been programmed to do so in advance.

Programming a computer to anticipate all possible forms which a human response can take is a very tedious and time consuming operation. Furthermore, it is uneconomical to program possible responses which may occur only very, very infrequently. Therefore, the format and vocabulary used in the tutorial mode is more constrained than they could be with the human tutor. Students must use a limited vocabulary so that it can be recognizable to the computer system.

An example of a tutorial CAI interaction between student and the system is reproduced in Table 2.

Dialogue Mode

In the dialogue mode a student can address the computer in free form, that is, with any vocabulary that appears appropriate. Rather than being constrained by the use of specific words, expressions, or symbols as in the tutorial mode the dialogue mode enables students to communicate freely with the computer system much as they would with a live teacher. At present the main mode of communication between students and computer is, of course, a computer terminal. There is a good deal of work occuring at present, however, to enable computers to "recognize" natural speech, which will make it possible for students to interact with CAI systems much the way they would with a live teacher.

It should be evident that the dialogue mode requires a set of developments in computer science which would enable the machine to recognize that different expressions and facts mean the same thing. That is, not only to recognize words, but the underlying structure of language which enables human beings to understand the equivalence of expression even though entirely different words are used. Such recognition by machines requires a series of breakthroughs in an area called artificial intelligence which are the subject of a good deal of present investigation. It is safe to say at present that there are no operating dialogues CAI systems. It is not safe, however, to predict how long this state of affairs will continue. Developments in computer sciences have been proceeding so rapidly that it is conceivable that breakthroughs enabling machines to understand the meaning structure of human discourse may occur within the next decade or two. At that time one can expect dialogue CAI systems to be operating.

Simulation

This mode simulates, that is, imitates a process. It is possible to program computers to simulate any process in which the underlying generalizations controlling all elements of the process are known. For example, a simulation of the propulsion system of naval ships has been developed which enables officers in the US Navy to learn and receive practice in the operations of a large ship's propulsion system without going nearer to the water than the nearest computer terminal. The student sits at a display which indicates the effect increasing fuel, reducing cooling, heightened wind resistance, or lowered water drag has on the speed of the ship. In addition, the system displays potential danger points to the propulsion system when excessive fuel, undue high heat, and a variety of other unanticipated, or infrequent conditions occur which would endanger the ship.

Learning something with a CAI simulation has a very different character than

"book learning." That is, rather than asking the student to understand a number of generalizations, and memorizing a series of related facts which the student is taught to apply in real-life situations at a later date, simulations enable students to apply the concepts immediately to problems identical to those encountered in eventual practice. The experience is extremely lifelike, vivid and enables the student to get "on the job training" from the beginning.

It is clear that simulations have a number of enormous advantages over other CAI modes. Students can conduct experiments and be given access to costly equipment and processes which they would otherwise be unable to approach. By having the ability to imitate quite exactly developments that would occur with large, expensive systems, lifelike learning can occur which is economical in the sense of being much cheaper than actually running the propulsion system described above. Simulations are also, of course, much safer. That is, students can make errors in the safety of the simulation environment which do not have harmful outcomes as they might in the real-life situation.

Simulation is the CAI mode which makes maximum use of the computer's capability for instruction. When a program has been written which contains all the essential relationships among variables involved in a particular simulation any of the parameters can be varied at will, and its effects on all other elements of the system studied. For example, if all the parameters controlling the law of supply and demand were known students could immediately study the effect any variation in supply and demand on the price of any commodity. Or, on the other hand, they could study the effect price has on supply or demand. In simulations the computer interacts with students not merely by presenting previously stored information in a particular sequence, but by actually computing likely outcomes of changing parameters of any elements of a situation. Students working on a CAI simulation may have entirely unique interaction with the systems. That is, they may vary parameters of a model, no other student has varied before. It goes without saying, of course, that it is recommended that some variations of the system are compulsory so that all students have at least a common core of experiences with the system.

Since simulation is so obviously an ideal use of computers for instruction it is paradoxical that there are relatively few CAI simulations available. A major problem in designing simulations is the knowledge base required. That is, in order to program a simulation for CAI the structure of knowledge in the area has to be so well developed that the effects of all possible variables on the system are quite

precisely known. That is, to return to the example of the law of supply and demand, we must know exactly the effects of variation in any of these parameters on all other variables. Now, it is known quite generally that prices depend on supply and demand. A general knowledge, however, is not adequate when a principle is programmed for presentation via simulation.

There are relatively few areas where we have sufficiently clear and precise knowledge of all the factors involved such that one can say that if X, for example, then Y and Z will result. That is, most areas of knowledge are not sufficiently precise with regard to "if:then" propositions to permit simulating. In those areas where a body of knowledge is available permitting one to make a series of precise "if:then" statements, such a principle could be programmed and presented to students in simulation form. The simulation of a patient interview presented in Table 3 is a clever use of CAI through its use of the simulation mode is limited, of course, by difficulties in the computer's understanding of natural language.

Storage and Retrieval of Information

It may be clear by now that computers have a relatively limited capacity to store information in central storage. Auxillary storage such as disc and magnetic tape, however, has vast capacities for information storage which can be scanned by rapid computer systems. This capacity has a number of interesting applications for the use of computers in instruction.

A researcher at Carnegie Mellon University (Ciaburri, 1969) stored all of the votes made by the Senators and Representatives in the United States Congress for the 20-year period preceding the Civil War. In addition, each of the Senators and Representatives were catagorized on a number of variables such as whether they were from the North or South, representing urban or rural interests, coming from a labor rich or labor poor area, or an area rich or poor in natural resources. Students studying American Hisotry of the period could then formulate generalizations, such as, "The real cause of the Civil War was economic conflict." They were, then, required to test these generalizations by accessing the data base. That is, they had to demonstrate that the economic interpretation provided a more accurate fit of the actual votes taken in Congress than some other generalizations.

By making a data base accessible for retrieval by computers, it is possible to give students a tool to test generalizations against specific facts pertinent to that generalization. Such use requires, in addition to availablity of the data, having the data categorized appropriately so that the generalization can be tested.

This use of computers employs the machine's ability to rapidly scan large data

bases which have been indexed according to relevant categories rapidly. This CAI mode allows students to test in a few moments what formerly may have required years and years of study.

COMPUTER MANAGED INSTRUCTION

In CMI instruction occurs by any variety of different methods away from the machine. That is, students may receive instruction in the form of text materials, coventional lectures, audio or video tapes, slides and the like. The evaluation of instruction, however, occurs on computer terminals. Students are frequently also given directions regarding the sequence in which instruction occurs.

Instruction delivered via CMI differs from conventional instruction in a number of ways: 1) The instruction is typically arranged in a series of modules which make up a set of self contained instructional exercises. 2) Specific, frequently behavioral, objectives for each module are specified prior to the student's beginning to work on the module. That is, students are given specific instructions regarding the kind of competence they are expected to have as a result of studying the particular modules. 3) A criterion of minimal competence is typically established which students have to attain in order to complete the module they are working on, and advance to the succeeding one. 4) A series of questions are constructed which evaluate the degree to which a student has attained a particular objective. This evaluation, often known as formative evaluation is generally administered when students feel that they have mastered the objective for a particular module. 5) Only after students have mastered a particular module to the previously established criterion of minimal competence can they advance to the succeeding module.

In CMI then, the computer serves as a rapid and convenienct avenue for the implementation of the instructional system outlined above. When students have completed a particular module they can, generally at their convenience, take the test for that module on a computer terminal. They are generally given immediate feedback regarding the outcome of the evaluation. If students have attained mastery at or above the pre-established criterion, they will be given directions on how to begin the next module. If, on the other hand, mastery has not been attained they are branched back to repeat the module until it is mastered. When instruction has been repeated students receive another formative test in order to check on their mastery. In most cases the items the students receive on later evaluative trials are different from those received previously.

A flow chart describing the sequence of events in a CMI instructional sequence is displayed in Figure 1. It should be noted that the chart makes no reference to computers at all. This is not accidental since in CMI computers serve only as a convenient avenue for the rapid administration of tests to students, maintaining the data regarding student achievement, and rapidly providing feedback to both student and instructor. Instructors receive periodic reports regarding the modules their students are working on, the number of tests they have attempted, and the results of these evaluations. It can be seen by inspection of the chart that CMI systems can, of course, be run without computers. Teaching assistants, clerks, or secretaries may administer the tests, score them, provide beedfack to students, give students directions as to their next step, and maintain periodic records to inform the instructor regarding the activities of students. The amount of clerical detail and effort required is such, that it is generally seen as being more efficient to manage all of this activity with the assistance of the computer.

There are numerous CMI systems operating at schools, colleges, armed forces and industrial training sites throughout the U.S. The software for managing the instructional sequence can esasily be written. It should be noted that this software does not include the actual questions presented to the studewnt. Instead, it consists of the programs which manage the sequence. Instructors who are experts in particular disciplines are still required to generate the appropriate questions, determine the correct answers, specify the instructional objectives, and determine the criterion of minimum competence. Once these decisions have been made by experts, the computer system can then take over and manage the instructional sequence.

It can be seen from the above that CMI, is actually not an instructional strategy but, instead consists of a series of periodic evaluations set into a coherent instructional strategy. The quality of any CMI sequence depends on two things: 1) The quality of the instruction delivered away from the terminal. 2) The validity and reliability of the questions used.

SUMMARY

This paper has discussed a number of ways in which computers can be used to support instruction. In computer assisted instruction students are taught while working on a computer system. This instruction can follow a number of different strategies which range from simply providing drill and practice to instruction in any

of the following modes: Tutorial, Dialoge, Simulation, and Retreival of Information. In CMI, instruction occurs away from the machine, and the computer is used principally for evaluation, providing feedback to students, and directing their learning activities.

It is much easier to prepare an instructional sequence for CMI since relatively little original programming is required. On the other hand, there is little difference between instruction delivered via CMI, or in any conventional mode. Since, instruction is off-terminal most traditional instructional strategies are quite appropriate. The major benefit of CMI systems are that the instructional materials are systematically arranged, and that students are evaluated and prevented from going on to advance modules before having attained competence on the preliminary one.

SUPERIVSED CLINICAL EXPERIENCE: TO BE OR NOT TO BE?

Ruth-Ellen Ostler

Health Occupation Education Section
New York State Education Department

Congratulations, Committee members and Regional Observers! The fruits of your conscientious deliberations in these six meetings are approaching readiness for harvesting.

You have:

- Proposed an overall design for Health Occupations Education for the future as new reflected in your "Sunburst" or "Sunrise" diagram;
- Specified the basic areas of competency for a basic Occupational Education Core component;
- Specified the basic areas of competency for a general HOE Core component;
- Proposed the elements of a model for the development of specific curriculums by writing teams;
- Developed some related recommendations dealing with operational and related programming aspects;
- You have today examined numerous instructional strategies for potential application to curriculum implementation.

We ask you now to give your attention to one other instructional component--instructional strategy, if you will, to which we assign the generic term of SUPERVISED CLINICAL EXPERIENCE--conducted outside the school/classroom setting, in actual job sites.

It is truly essential that you consider recommendations relative to instructional strategies for teaching and guiding student learning activities as they acquire the competencies to perform in the jobs and areas included in your proposed structional design, that one of your recommendations deal with the SUPERVISED CLINICAL EXPERIENCE Component.

- It is really important for students to have directed on-job experience as part of their preparation for entry-level performance as health care workers?
  --in all program fields?
  --in selected program fields?

or, not at all?

- o If important, should it be required? or, optional?
- o If important, what alternatives are appropriate?
- o If important, what proportion of the preparation time should be devoted to SCE? Should length differ relative to specific fields?
- o If important, how can affiliations be achieved, particularly where currently there are constraints of site availability, adequacy of supervision, scheduling, costs, legal practice, and other factors?
- o In view of all we have heard relative to self-learning processes and the possible demise of the educational system as we now know it, is it possible that something akin to SCE is all the more important relative to practice and demonstration of job competency?

What is the Current Situation?

Under current State standards, supervised clinical experience is an integral part of every Health Occupations Education program, provided through scheduled assignments under superivsion, in health care delivery sites appropriate to the field. A general "rule of thumb" proportion of approximately one-third of the total instructional time has been recommended, with some flexibility recognition of differing conditions at the local level.

Appendix 1 is HOE - IS#18, "Supervised Clinical Experience--One of three Essential Components of Health Occupations Education Programs."

Prepared to give guidance to field personnel, this describes SCE and also presents, on pages two and three, five possible routes to implementing this instructional component:

- o TRADITIONAL
- o COOPERATIVE EDUCATION - CONCURRENT
- o COOPERATIVE EDUCATION - CAPSTONE
- o INTERNSHIP/TRAINEESHIP
- o APPRENTICESHIP - this option actually involves only related instruction in the school setting. The real "meat" of the training is accomplished on-the-job under the "master" practitioner.

A possible substitute for SCE, conducted not on the job site, but in the school setting, is SIMULATION, mentioned on page 4 of IS#18, and is potentially appropriate for the laboratory-based programs in the dental and

medical fields, and under carefully designed conditions and criteria. Barbara Pickard presents this in greater detail in her paper.

Current State standards are presented in brief form for six HOE proram areas in Appendix 2, entitled "Program Standards for Selected Health Occupations Education Programs." I call your attention to the next-to-the last column.

What Actually Happens in the Field?

In response to questions and concerns expressed by various field personnel in recent years, we have at the direction of Assistant Commissioner Gerald L. Freeborne carried on several types of internal and informal action:

1. To get an idea how employers view on-job experience, an informal telephone survey of employers of selected health care workers was conducted in Fall 1978 involving a non-statistical sample of 94 agencies--employers in 5 major employment areas of the State. Seventy-three agencies of 94 made up the final adjusted sample, representing Health Centers/Groups/Clinics; Nursing Homes, Hospitals; and Dental and Medical Laboratories. Results supported the importance of including an SCE component in the educational program, as 94.8 percent of the respondents indicated that they believe prior work experience by the student to be essential and preferred to employ graduates with such experience.
2. Exploration of the need and importance with our colleagues in higher education. Responses reinforced the importance of actual directed experience in health care delivery site.
3. In an effort to determine how schools actually implement this aspect, another informal telephone survey of all secondary, adult, and postsecondary agencies, exclusive of proprietary schools, was carried out during the Fall 1979. The final sample included 106 educational agencies offering identifiable programs in the 8 Statewide HOE program areas--60 at secondary/adult, and 46 at community/2-year college/university level. Appendix 3 is a "Summary Report" of this study, for your later reference. I refer you to pages 5 - 8--"Summary and Recommendations," the first two paragraphs, and to Table 2 on page 6.

"The evidence relative to current practice provided through this informal study indicatess that Supervised Clinical Experience is considered an essential

component of preparatory Health Occupations Education programs in seven of the eight categories surveyed: Dental Assisting, Health Assisting, Medical Assisting, Medical Laboratory Assisting/Technology, Nurse's Assistant, and Practical Nursing.

Recognition of the importance of extensive experience is also exhibited in responses provided by Dental Laboratory Technology program contacts, but the preferred approach is reported to be through a carefully-designed and controlled laboratory simulation, rather than the external SCE route. Respondents for two postsecondary programs in Medical Laboratory Assisting/Technology also reported use of laboratory simulation."

I refer you to the remainder of the report for further detail.

Where is this SCE Carried Out?

Based on information from the later study, and on the field visit/observation experience of the members of our staff, it is evident that the type of supervised clinical experience varies, depending upon clinical sites available in the community and relative to the specific occupation.

For example, large cities usually provide a large number of diversified sites, whereas small communities may have available only one hospital, a nursing home, and one or two independent practitioners in one or more fields.

Most Nurse's Assistant and Practical Nursing programs schedule approximately one-third of the total hours for SCE. This is considered essential locally for both of these programs. Reported figures as noted in Table 2 support this.

Provision of the SCE component for students in the Dental Assisting program varies a great deal. it is sometimes difficult to arrange for and provide such experience in a busy dentist's office, but some dentists are interested and are very helpful in arranging a meaningful clinical experience. Sometimes a dental clinic is held at the occupational center itself, with the assistance of local dentists. Another possible arrangement occurs where dental assisting students go to a hospital dental clinic to observe and assist dentists as appropriate. Most Dental Assisting programs provide extensive practice in simulated dental assisting procedures.

SCE for Medical Assisting students can and often is arranged, but again it is more difficult and time consuming to arange what more usually are one-on-one experiences, than those available to Nurse's Assistant, Health Assisting and Practical Nursing students.

Field personnel in Dental and Medical Laboratory programs are continuously seeking ways to orient students to the actual work situation. Some laboratories do accept students for SCE, but much work is needed in these areas.

Written affiliation agreements; regular, qualified, and planned supervision; continuous and realistic assessment procedures; carefully-designed pre-preparation of students prior to SCE assignments; follow-up and reinforcement in the classroom; legal restrictions; and transportation and costs are some of the factors which influence the availability, length, potential impact, and quality of SCE experiences.

What National Importance?

The National Commission on Allied Health Education[1] recognized the value of clinical experience and agreed upon its importance sufficiently to focus on this aspect of the educational program in 2 of their 15 prime recommendations (#7 and #8) and followed-up with 7 corollaries for action (PP. 183-190).

Recommendations and/or requirements for clinical components are specified in the standards established by such accrediting bodies as the American Medical Association/American Association of Dental Assistants, National Association of Dental Laboratories, National League for Nursing; American Medical Association/American Association of Medical Assistants, Accrediting Bureau for Health Education Schools/Association of Medical Technologists. (See Appendix 2.)

We urge your attention to recommendations relative to this aspect.

Thank you for the opportunity to present this topic.

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[1]National Commission on Allied Health Education. "The Future of Allied Health Education." San Francisco: Jossey-Bass, 1980.

APPENDIX I

THE UNIVERSITY OF THE STATE OF NEW YORK
The State Education Department
Division of Occupational Education Instruction
Bureau of Health Occupations Education
Albany, New York 12230

HEALTH OCCUPATIONS EDUCATION INFORMATION SERIES NO. 18

SUPERVISED CLINICAL EXPERIENCE - ONE OF THREE ESSENTIAL COMPONENTS OF HEALTH OCCUPATIONS EDUCATION PROGRAMS

With increasing attention to the need for graduates of occupational education programs to exhibit competency in the performance of the tasks required for a particular job, actual directed and well-supervised experiences on the job site take on increased significance. Supervised clinical experience provides opportunity for students to begin the adaptation from the classroom to the actual job situations. Repeatedly health industry employers across the State report that they prefer to hire personnel who have had some supervised job experience. Following orientation to the unique aspects and routines of the particular employment setting, such personnel can be expected to perform their assigned tasks with minimal direction, relate well to fellow employees, accept supervision, and display favorable attitudes toward the job and the employing agency.

THREE COMPONENTS OF THE INSTRUCTIONAL DESIGN

In planning the instructional program it is important to make adequate provision for three major components:

- Theoretical Content is task-oriented; includes major performance objectives, supporting or enabling objectives, and cognitive, affective, and psychomotor information necessary to the development of basic knowledge, skills, and attitudes needed by the health worker.

- Supervised Laboratory Practice provides students with the opportunity to develop skill in performing required tasks based on the knowledge and understanding gained. Students' participation in laboratory activities is invaluable since it enables them to develop skill in performance in a controlled environment which closely simulates the on-job setting under the supervision of a qualified instructor.

- Supervised Clinical Experience provides the student with the opportunity to apply knowledge and/or skills gained in the classroom and laboratory to an on-the-job situation. This aids students in synthesizing their learning. The clinical, or work experience, should be based upon specific objectives since it is an integral part of the total learning process. The teacher determines the type, length, and location for each student's assignment, in cooperation with the student and personnel of affiliating agencies. Cooperative planning between the teacher and the assigned agency supervisor enhances the quality of the experiences provided. Periodic assessment of the student's progress by the student, the teacher, and the assigned supervisor or other designated personnel provides the type of feedback needed for improvement of the student's performance and the program.

STRATEGIES FOR PROVIDING THE SUPERVISED CLINICAL EXPERIENCE COMPONENT

While the traditional mode of supervised clinical experience is preferred in preparing most health care personnel due to the ability to integrate this experience at relevant stages of the program and be assured of qualified supervision, it is recognized that varying circumstances may result in the need for an educational agency to provide approximately equivalent on-job-site supervised experiences in one of several ways.

Perhaps a one-to-one worker-client/employer relationship is necessary where a sufficient number of school supervisors cannot possibly be provided (e.g., for Dental Assistants and Medical Assistants in practitioners' offices or Homemakers/Home Health Aides assigned in individual family homes). Perhaps the number and location of clinical sites is widely scattered, and the number of students who can be accommodated at one time is limited (e.g., Community Health Centers, Medical and Dental Laboratories).

The availability and location of appropriate clinical sites and other resources, transportation, quality of supervision, availability of appropriate insurance coverage, and other factors may prevail and generate a need to consider other avenues to providing approximately equivalent clinical experience.

Cooperative planning with local employers, health professionals, and members of the School's or District's Advisory and Consultant Committees will help to provide the kind of clinical experiences for students which will maintain quality standards for performance and supervision. The particular pattern(s) selected to meet the on-job-clinical experience component requirement for an approvable Health Occupations Education program should become a planned and reported part of the educational agency's program.

Five possible alternate modes for providing supervised clinical experience are described below:

- TRADITIONAL - SUPERVISED CLINICAL EXPERIENCE, INTEGRAL COMPONENT OF SCHOOL-BASED EDUCATIONAL PROGRAM - AT ADULT/POSTSECONDARY LEVELS MAY BE CALLED EXTERNSHIP (UNPAID)

  Planned and directed experiences on-job-site in a health care delivery agency; experiences directly related to skills and knowledge as introduced and practiced in the in-school classroom and laboratory; direct supervision by qualified instructors on school staff in cooperation with the health provider agency's staff; affiliation agreements or contracts between the educational agency and the health care delivery agency; students under liability coverage of the educational agency, or registered as volunteers and under liability coverage of the health care delivery agency; no wages or salary paid students.

° COOPERATIVE EDUCATION - CONCURRENT (SPECIALIZED/DIVERSIFIED) (PAID)

Planned and directed experiences while employed, during same term(s) as the in-school classroom and laboratory practice components; experiences directly related to in-school components introduced in class, planned cooperatively by supervisor, employer, and student; related instruction component is concurrent in-school component; direct on-job supervision by qualified member(s) of employer's staff, periodic supervision by school-employed Health Occupations Education or Diversified Cooperative Education Coordinator; work agreements negotiated cooperatively by school, student and employer; students as employees, under liability coverage of employers; wages or salary based upon prevailing scales and legal restrictions.

° COOPERATIVE EDUCATION - CAPSTONE (SPECIALIZED/DIVERSIFIED) (PAID)

Planned and directed experiences while employed, during term(s) immediately upon completion of the in-school classroom and laboratory practice components; experiences apply previsouly learned skills and knowledge, planned cooperatively by supervisor, employer, and student; related instruction component minimum of one in-school class period per week; direct on-job supervision by qualified member(s) of employer's staff, periodic supervision by school-employed Health Occupations Education or Diversified Cooperative Education Coordinator; work agreements negotiated cooperatively by school, student, and employer; students as employees under liability coverage of employer; wages or salary based upon prevailing scales and legal restrictions.

° INTERNSHIP/TRAINEESHIP (PAID)

Planned and directed experiences while employed or assigned full-time to the employment site, following completion of in-school classroom theory and laboratory practice in high school diploma, certificate, or degree program; experiences apply previously learned skills and knowledge, planned cooperatively by student and employer, subject to approval of education agency counselor; no in-school related instruction component; direct on-job supervision by qualified member(s) of employer's staff, periodic reports to educational agency counselor; work agreements negotiated by intern/trainee and employer; intern/trainee, as employee, under liability coverage of employer; often with remuneration, wages or salary based upon prevailing scales and legal restrictions, sometimes with a stipend arrangement.

° APPRENTICESHIP - APPRENTICEABLE HEALTH OCCUPATIONS ONLY (PAID) (SPECIALIZED; SELECTED OCCUPATIONS ONLY)

Planned combination of on-job instruction and related study in State-approved apprenticeable occupations while employed as an apprentice to a qualified, experienced "master" health worker in a health care delivery agency for a minimum of 2000 hours (1 year); initiated and directed by the employer, labor union, or employment service; includes related instruction component (generally theory only) of a minimum of 144 hours per year as planned and offered by an educational agency; direct supervision on-job by the worker to whom apprenticed, no supervision by educational

LABORATORY SIMULATION POSSIBLE SUBSTITUTE FOR ON-JOB SUPERVISED CLINICAL EXPERIENCE IN SELECTED PROGRAMS

For selected programs such as Dental Laboratory Technology and Medical Laboratory Assisting/Technology it may be possible to substitute laboratory simulation experience for actual on-job site supervised clinical experience. Laboratory facilities must be exceptionally well-equipped and industry process controls replicated. Local agencies desiring to pursue this route should contact the Bureau of Health Occupations Education for assistance.

SPECIFIC CONCERNS WHEN PREPARING MEDICAL LABORATORY PERSONNEL FOR EMPLOYMENT IN NEW YORK CITY

A certificate of qualification (commonly called licensure) obtained through examination is required for employment in Medical Laboratories in the City of New York. This is a requirement unique to New York City and is not required Statewide.

Standards are specified in Article 13 of the New York City Health Code, administered by the New York City Department of Health. As a minimum, six months of clinical experience, 1,000 hours in approved laboratories, is required for the applicant to qualify for the examination.

Administrators of Medical Laboratory Assisting/Technology programs operating in New York City schools or those in the Greater Metropolitan Area who prepare persons to work in the City's Medical Laboratories should design their programs to incorporate the standards of this Code. It is particularly desirable that the program, including the supervised clinical experience component, be designed in cooperation with, and be acceptable to, the New York City Department of Health. The clinical experience hours, if recognized/approved by that Agency, can be accumulated toward those required to meet eligibility standards for the New York City certification examination.

To accomplish this, program administrators are encouraged to contact:

New York City Department of Health
Bureau of Laboratories
Division of Laboratory Improvement
455 First Avenue
New York, New York 10016
(212) 340-4461, 62, 63

RELATIONSHIP OF SUPERVISED CLINICAL EXPERIENCE TO FAIR LABOR STANDARDS ACT (FEDERAL) AND MINIMUM WAGE ORDERS (STATE)

The TRADITIONAL plan for providing clinical experience does not involve payment of wages or salary to students obtaining vocational experience. Such experience is arranged by the school's program teacher/coordinator, who accompanies and supervises students during the regular school day. Depending upon the policies of the affiliating agency, such students sometimes are considered in "volunteer" status. Agreements drawn between the educational and health care agencies specify responsibilities of each. In either case minimum wage orders do not apply.

Under all other alternate strategies identified in the previous section which may be used to provide the supervised clinical experience, students are considered employees in "learner" or "apprentice" status and minimum wage orders apply. Application by the employer is necessary if these "employees" are to be employed at less than minimum wage. Information and advice relative to details in each specific case can be obtained by contacting the local District office of the Division of Labor Standards of the New York State Department of Labor and the local area office of the Wage and Hour Division of the United States Department of Labor.

BHOE/IS#18
November 1979

BUREAU OF HEALTH OCCUPATIONS EDUCATION - NEW YORK STATE EDUCATION DEPARTMENT

PROGRAM STANDARDS FOR SELECTED HEALTH OCCUPATIONS EDUCATION PROGRAMS

HOE PROGRAM	OCCUPATIONAL OBJECTIVES (JOB TITLES)	PROGRAM APPROVAL WORKER CREDENTIALLING	STATE MINIMUM STANDARDS PROGRAM LENGTH SECONDARY	PROGRAM LENGTH ADULT	CLINICAL EXPERIENCE SECONDARY	CLINICAL EXPERIENCE ADULT	NATIONAL MODEL AGENCIES & STANDARD
DENTAL ASSISTING	Dental Assistant Chairside Assistant Dental Office Receptionist	Approval by SED required No State Agency Credentialling National Certification by examination Certificate by approved local agency	800 Hours 2 Academic Years 2½ Hours per Day 160 Teaching Days	600 Hours Scheduling Varied	250, or approx. 1/3 of 800 Hrs. Based on Competency Achievement	200 of 600 Hrs.	ADA, AADA One Academic Year, Full-time study 300 Hrs. Clinical recommended; integral component; Based on Competency Achievement
DENTAL LABORATORY TECHNOLOGY	Dental Laboratory Technician Trainee Dental Laboratory Technician Dental Technician Dental Laboratory Assistant	Approval by SED required No State Agency Credentialling National Certification by examination (written, practical, following five years experience)	800 Hours 2 Academic Years 2½ Hours per Day 160 Teaching Days	Same as Secondary; Scheduling Varied	250, or approx. 1/3 of 800 Hrs. Based on Competency Achievement	Same as Secondary	ADA, NADL Two Academic Years, full-time study Practical Experience integral Component; Based on Competency Achievement
HOME HEALTH ASSISTING	Homemaker Personal Care Services Worker Home Health Aide	Joint State-Agency Program Approval Required (NYSED-HEE,HOE; NYSDH, NYSDSS) No State or National Credentialling Certificate by Approved Local Agency	Adult Only	90 Hours	Adult Only	30 of 90 Hrs.	NCHHHAS, NLN Minimum of 60 Hrs. Plus Clinical Experience

APPENDIX 2

HOE PROGRAM	OCCUPATIONAL OBJECTIVES (JOB TITLES)	PROGRAM APPROVAL WORKER CREDENTIALLING	STATE MINIMUM STANDARDS PROGRAM LENGTH SECONDARY	PROGRAM LENGTH ADULT	CLINICAL EXPERIENCE SECONDARY	CLINICAL EXPERIENCE ADULT	NATIONAL MODEL AGENCIES & STANDARD
MEDICAL ASSISTING	Medical Assistant Medical Office Assistant Medical Clerk Central Supply Assistant Medical Receptionist	Approval by SED required No State Agency Credentialling National Certification by examination Certificate by Approved Local Agency	800 Hours 2 Academic Years 2½ Hours per Day 160 Teaching Days	Same as Secondary except scheduling Varied	250, or approx. 1/3 of 800 Hrs. Based on Competency Achievement	Same as Secondary	AMA, AAMA One Academic Year, Full-time study 160 Hours "externship, minimum; integral component ABHES, AMT* 24 Weeks, Full-time (5hrs),600 HR. Min. Externship of 160 HRS. Optional (T=760 min.
MEDICAL LABORATORY ASSISTING	Medical Laboratory Assistant Medical Laboratory Technician Medical Laboratory Technician Trainee Clinical Laboratory Trainee Clinical Laboratory Technician Trainee	Approval by SED required No State Agency Credentialling NYC Certificate of Qualification by examination-6 months/1 year experience National Certification by examination Certificate by Approved Local Agency	800 Hours 2 Academic Years 2½ Hours per Day 160 Teaching Days	Same as Secondary, Scheduling Varied	250, or approx. 1/3 of 800 Hrs. Based on Competency Achievement	Same as Secondary	AMA, ASCP, NAACLS One Academic Year, Full-time study Experience based on Competency Average, accreditable programs: Theory/Lab Practice - 640 Hrs. Supv. Clin, Experience- 284 Hrs. ABHES, AMT* 12 mos, 1500 HRS + 12 mos. Clinical, o 18 mos, 2000 HRS + 6 mos. Clinical
NURSE'S ASSISTANT	Nurse's Aide Nurse's Assistant Nursing Assistant Orderly Nursing Home Aide Health Center Aide Hospital Aide	Approval by SED required No State Agency or National Credentialling Certificate by Approved Local Agency	400 Hours 1 Academic Year 2½ Hours per Day 160 Teaching Days	120 Hours	125, or approx. 1/3 of 400 Hrs. Based on Competency Achievement	30 of 120 Hrs.	No National Accreditation or Certification; Some states licence or register

INSTRUCTIONAL COMPONENTS FOR HEALTH OCCUPATIONS EDUCATION PROGRAMS:
STATUS OF THE SUPERVISED CLINICAL EXPERIENCE COMPONENT DECEMBER 1979

SUMMARY REPORT OF STUDY

A telephone survey of all secondary, adult, and postsecondary educational agencies offering selected Health Occupations Education programs below the baccalaureate level was conducted at the request of Assistant Commissioner Gerald L. Freeborne, from October 1 to mid-November 1979. The charge given by the Assistant Commissioner was to determine the actual status of supervised clinical experience as a component of the total instructional program, as reported by all educational agencies, except Registered Private Schools, which offer the identified programs at one or more of the three educational levels throughout New York State.

The final list for purposes of survey included the following eight program title categories:

1. Dental Assisting (Dental Office Assisting, Dental Assisting Technologies)
2. Dental Laboratory Technology (Dental Technology, Dental Laboratory Technologies, Dental Laboratory Assisting)
3. Health Assisting (Health Services, Health Careers, Health Occupations, Health Occupations Education Foundations)
4. Home Health Assisting (Homemaker-Home Health Aide)
5. Medical Assisting (Medical Office Assisting, Medical Assisting Technologies, Physician's Office Technician)
6. Medical Laboratory Assisting (Medical Laboratory Technology, Medical Technology, Medical Laboratory Technologies, Clinical Laboratory Technology, Biological Laboratory Technology; various specialties, e.g., Histotechnology, Cytotechnology)
7. Nurse's Assistant (Nurse Assisting, Nurse Aide, Nurse Aide/Orderly)
8. Practical Nursing (Licensed Practical Nursing)

Educational agencies participating in the study included the following:

I.	SECONDARY AND ADULT	
	A. Major Cities: Albany, Buffalo, New York City, Rochester, Syracuse and Yonkers	5
	B. Boards of Cooperative Educational Services (BOCES)	45
	C. Other Local Educational Agencies (LEAs)	9
	Sub-Total	60
II.	POSTSECONDARY	
	A. State University of New York (SUNY) - Agricultural and Technical Colleges	6
	B. State University of New York (SUNY) - Community Colleges	20
	C. City University of New York (CUNY) - Community Colleges	4
	D. Independent Agencies - Community Colleges, Colleges, Universities	6
	E. Private/Specialized Agencies	10
	Sub-Total	46
TOTAL		106

An interview recording form/schedule was designed and entitled "Instructional Components for Health Occupations Education Programs." This provided for recording the following data:

- AGENCY INFORMATION
  - Name and County of School District (Agency/Institution)
  - Name, Title, and Telephone Number of Local Administrator (Other responsible personnel contacted)

- PROGRAM INFORMATION
  - HOE Program Title (s)
  - Level:
    - Secondary
    - Adult
    - Postsecondary
  - Program Length:
    - Years (Months, Weeks)
    - Hours per Year
    - Total Hours
  - Instructional Components (Contact Hours) (By Year 1, Year 2 - or Term 1, 2)
    - Classroom Theory
    - Laboratory Practice
    - Supervised Clinical Experience
    - Total
- COMPONENTS

For programs where Supervised Clinical Experience is provided, interviewers asked the following questions for further clarification of this component:

a. Is the Supervised Clinical Experience component a part of the total instructional program, included in the total instructional contact hours?
b. Does the student receive pay for this experience?
c. In what types of employment settings is this component conducted?
d. Who supervises the student during this experience, and how often?
e. Is the program nationally accredited, or in the process of being accredited? If so, by what national accrediting body? (If applicable, particularly at the postsecondary level)

Procedures in Analysis of Data

Data from the basic interview form was summarized and appropriate computations performed to provide the following types of information:

- Number and percent of agencies and programs in study - total and by level, type, all program categories, and each category separately

- Number and percent of programs including a Supervised Clinical Experience component

- Range and average of instructional contact hours for programs - by level, type, all program categories and each category separately.

- Range, average, and percent of average of instructional contact hours for programs including a supervised clinical experience component - by all program categories, for each program category separately, at all program levels and by each program level separately.

Since this is an informal study, and not developed under sophisticated research design, no tests of statistical significance have been applied to the data.

Because of the informality of the study and the time requirements to complete it, the State Education Department did not attempt to validate the accuracy of the instructional and clinical contact hours reported by the individual schools, their data are reported at "face value."

Findings

When ranked by number of programs reported, the program concentration was evident, as follows:

Rank	Agency Type	Program Level	Number of Agencies	Number of Programs	Percent of Total
1	BOCES	Secondary/Adult	44	188	76
2	SUNY - Community Colleges	Postsecondary	20	34	11
3	Major Cities	Secondary/Adult	5	22	7
4	Other LEAs	Secondary/Adult	9	16	5
5	Independent Colleges	Postsecondary	6	14	5
6	SUNY - A & T Colleges	Postsecondary	6	11	4
7	Private/Special Agencies	Postsecondary	9	9	3
8	CUNY - Community Colleges	Postsecondary	4	5	2

Usable responses were received from 97 percent (103 of 106) of the educational agencies surveyed relating to 299 separate programs in the categories and at the levels included in the study. Nearly 85 percent (253 of 299) of all programs surveyed at all levels and in all program categories were found to include an SCE component. (See Table.1)

The following rank-order listing clearly presents the current status relative to inclusion of the SCE component in operating programs:

Rank	Program Title Category	Ratio Programs with SCE to Total Programs	Percent of Total
1	Practical Nursing	79/79	100
2	Nurse's Assistant	43/47	92
3	Health Assisting	32/35	91
4	Dental Assisting	26/33	79
5	Medical Laboratory Assisting/Technology	33/44	75
6	Medical Assisting	19/26	73
7	Home Health Assisting	18/27	67
8	Dental Laboratory Technology	3/8	38

Results presented by program field follow:

Table 3. Health Occupations Education Programs with Supervised Clinical Experience Components As Reported By Agency Respondents, By HOE [illegible] Category

[illegible] and Type of Agency	All [illegible] Agencies (Number)	Programs (Number)	*Programs with SCE Component in HOE DA No.	DLT No.	HA No.	HHA No.	MA No.	MLA No.	NA No.	PN No.	[illegible] No.	[illegible] %
TOTAL SURVEYED	103	299	33	8	35	27	26	44	47	79	253	84.61
I. SECONDARY AND ADULT												
A. MAJOR CITIES	5	22	2	0	4	4	2	1	0	7	20	90.90
B. ESCDs	44	188	17	1	26	14	7	3	37	52	157	83.51
C. OTHER LEAs	9	16	0	0	2	0	0	0	6	7	15	93.75
SUB-TOTAL	58	226	19	1	32	18	9	4	43	66	192	84.95
II. POSTSECONDARY												
A. SUNY-UNIV. COLLEGES	6	11	0	2	0	0	1	4	0	2	9	81.81
B. SUNY-COMM. COLLEGES	20	34	5	0	0	0	5	13	0	2	25	73.57
C. CUNY-COMM. COLLEGES	4	5	0	0	0	0	1	4	0	0	5	100.00
D. INDEPENDENT AGENCIES	6	14	2	0	0	0	3	8	0	1	14	100.00
E. PRIV./PUBLIC AGENCIES	9	9	0	0	0	0	0	0	0	8	8	88.88
SUB-TOTAL	45	73	7	2	0	0	10	29	0	13	61	83.56
TOTAL ALL AGENCIES - NO.	103	299	26	3	32	18	19	33	43	79	253	84.61
PERCENT OF TOTAL SURVEYED	-	-	78.78	37.5	91.42	66.6	73.07	75.0	91.18	100.	84.61	-

* Program title abbreviations:

DA = Dental Assisting
DLT = Dental Laboratory Technology
HA = Health Assisting
HHA = Home Health Assisting
MA = Medical Assisting
MLA = Medical Laboratory Assisting
NA = Nurse's Assistant
PN = Practical Nursing

SCE = Supervised Clinical Experience
HOE = Health Occupations Education

Dental Assisting. PROVIDES STRONG SUPPORT FOR SCE AS AN ESSENTIAL COMPONENT OF INSTRUCTION. Nearly 80 percent (26 of 33 programs) of surveyed program include SCE for approximately 30 percent of total time. Two of balance are adult supplementary requiring no SCE.

Dental Laboratory Technology. Preference reported for laboratory simulation which must be in well-designed and equipped facilities and under strictly enforced controls. Only 38 percent (3 of 8 programs) reported SCE components, averaging over 50 percent of total time for this purpose. One fourth of the programs (2 of 8) are reported to be adult supplementary requiring no SCE.

Health Assisting. STRONG SUPPORT FOR SCE AS AN INTEGRAL COMPONENT OF THE CURRICULUM IS PROVIDED AS OVER 90 PERCENT OF SURVEYED PROGRAMS ARE REPORTED TO INCLUDE THIS COMPONENT, AVERAGING 36 PERCENT OF TOTAL INSTRUCTIONAL TIME. Programs are reported at secondary and adult levels only.

Home Health Assisting. JOINT-STATE AGENCY APPROVAL IS REQUIRED FOR ADULT-LEVEL ONLY OPERATION, AND A MINIMUM OF 30 HOURS OF SCE AN ESSENTIAL COMPONENT FOR APPROVAL. Sixty-seven (67) percent of programs are found to include SCE averaging 37 percent of total time. Balance of programs operate under various approved experimental and special arrangements.

Medical Assisting. QUITE STRONG SUPPORT FOR SCE INSTRUCTIONAL COMPONENT WITH NEARLY THREE-QUARTERS OF PROGRAMS (19 of 26) EVIDENCING SCE COMPONENTS. Average use of total instructional hours over 20 percent is four (4) of balance are adult supplementary programs requiring no SCE.

Medical Laboratory Assisting/Technology. SCE STRONGLY SUPPORTED BY REPORTED INCLUSION IN OVER THREE-QUARTERS (33 of 44) OF SURVEYED PROGRAMS. An average of 36 percent of total time is assigned to SCE. Three of remaining programs are adult supplementary, with no SCE necessary.

Nurse's Assistant. SCE REPORTED TO BE A COMPONENT OF OVER 90 PERCENT OF PROGRAMS (43 of 47). An average of 40 percent of total time is used. STRONG SUPPORT FOR THIS AS AN ESSENTIAL INSTRUCTIONAL COMPONENT IS EVIDENCED.

Practical Nursing. SCE IS A COMPONENT OF 100 PERCENT OF PROGRAMS SURVEYED AND IS A REQUIREMENT FOR PROGRAM REGISTRATION UNDER COMMISSIONER'S REGULATIONS. Use of an average of approximately 50 percent of total instructional time is evidenced.

Summary and Recommendations

The evidence relative to current practice provided through this informal study indicates that Supervised Clinical Experience is considered an essential component of preparatory Health Occupations Education programs in seven of the eight categories surveyed: Dental Assisting, Health Assisting, Medical Assisting, Medical Laboratory Assisting/Technology, Nurse's Assistant, and Practical Nursing.

Recognition of the importance of extensive experience is also exhibited in responses provided by Dental Laboratory Technology program contacts, but the preferred

approach is reported to be through a carefully-designed and controlled laboratory simulation, rather that the external SCE route. Respondents for two postsecondary programs in Medical Laboratory Assisting/Technology also reported use of laboratory simulation.

With the exception of schools subject to the State's Private School law, all (N = 106) known agencies offering secondary and/or adult, and postsecondary programs in the above-mentioned seven (7) categories and in Dental Laboratory Technology, (T = 8 categories) and under State Education Department auspices, comprised the 100 percent population sample surveyed. Responses were received from 97 percent (N = 103) of the agencies in the sample, covering a total of 299 programs. At the secondary and adult levels, 58 of 60 agencies (97 percent) reported data relative to 226 programs and 43 of 45 postsecondary agencies (98 percent) provided information about 73 programs in the survey categories.

Across all program fields and levels, eighty-five (85) percent of all programs surveyed (253 of 299) were reported to include the Supervised Clinical Experience component. Exclusive of Dental Laboratory Technology programs, the importance of this instructional component is evidenced by practice in the field, whether programs are one or two years in length, as shown in Table 2. Those including SCE in the seven remaining categories range from 58-100 percent for programs of one year or less, and from 80-100 percent for two-year programs. These programs exhibit a range in hours assigned to SCE from slightly under one-third of the total instructional time (Dental Assisting, two-year, 27 percent) to over fifty percent (Practical Nursing, one-year, 52 percent). A series of reference tables (Tables 13-21) which support the data reported in Table 12 is located in Appendix H.

As noted in previous sections of this report, the majority of the 15 percent of programs not including the Supervised Clinical Experience component are adult-level, short-term, non-preparatory programs designed to supplement and enhance already existing skills and generally require no SCE. Others which do not include SCE are reported to provide as an alternate a carefully designed and controlled laboratory simulation, or are under specialized approval arrangements.

Of the eight (8) Dental Laboratory Technology programs in the survey sample, two-thirds of those of one year or less (2 of 3, 33 percent) and 60 percent of two-year programs (3 of 5) reportedly include no SCE. However, two programs in the former grouping are short-term adult, non-preparatory programs and require no SCE. Respondents for the three (3) two-year programs report use of the carefully-designed and controlled laboratory simulation approach. For the two (2) two-year programs which do include an SCE component, the average use of time for this was found to be 55 percent, a high proportion then computed for any of the other program categories.

Based upon the results of this survey, the following recommendations for further action are posed:

1. Supervised Clinical Experience should be a required component of all preparatory programs in the Health Occupations Education program categories included in this study.

Table 2 Instructional Contact Hours Reported By All Educational Agencies for all Types of Programs (Two Year, One Year or Less - Preparatory or Supplementary) with Supervised Clinical Experience Components at Secondary, Adult, and Postsecondary Levels, by Health Occupations Education Program Category

Program Category		Agencies Reporting (No.)	Programs Reported (No.)	Instructional Contact Hours		Programs with SCE Component			Instructional Contact Hours				
									Total Program		SCE Component		
				Range	Average	Agencies Reporting (No.)	Programs Reported (No.)	Percent of Total	Range	Average	Range	Average	Percent of Total
DENTAL ASSISTING	1yr.	11	16	60-1020	426.4	9	10	62.5	135-1020	585.1	45-540	194.6	33.3
	2yr.	16	17	532-1230	957.8	15	16	94.1	532-1230	957.6	40-540	255.6	26.7
DENTAL LABORATORY TECHNOLOGY	1yr.	2	3	120-450	250.0	1	1	33.3	450	450.0	30	30.0	6.7
	2yr.	5	5	900-1880	1255.6	2	2	40.0	1170-1880	1525.0	225-1440	832.5	54.6
HEALTH ASSISTING*	1yr.	17	18	133-570	318.3	17	15	83.3	171-570	444.5	50-384	168.1	37.8
	2yr.	17	17	800-1110	933.1	17	17	100.0	800-1110	933.1	80-759	332.3	35.6
HOME HEALTH** ASSISTING	1yr.	25	27	60-280	96.9	18	18*	66.7	90-280	110.1	22-200	40.3	36.6
	2yr.	0	0	-	-	0	0	-	-	-	-	-	-
MEDICAL ASSISTING	1yr.	12	13	90-931	449.1	7	8	61.5	266-931	558.9	45-480	204.6	36.6
	2yr.	13	13	503-1710	947.5	11	11	84.6	503-1710	929.9	30-300	149.0	16.0
MEDICAL LABORATORY ASSISTING	1yr.	10	12	120-540	763.1	5	7	58.3	540-1461	1055.9	36-576	386.9	36.6
	2yr.	31	32	610-4230	1470.9	25	26	81.3	610-2640	1434.6	-1536	493.8	34.4
NURSES' ASSISTANT	1yr.	37	42	75-600	355.1	36	42	92.9	90-750	320.8	12-600	140.2	43.7
	2yr.	5	5	653-1000	866.9	[illegible]	4	80.0	653-1000	765.6	195-378	252.9	33.0
PRACTICAL NURSING ***	1yr.	37	38	325-1645	1024.9	37	38	100.0	325-1645	1024.3	98-1200	503.9	51.8
	2yr.	37	41	900-2094	1078.5	37	41	100.0	900-2094	1078.5	200-1002	509.3	47.2

* All Secondary Level

** Program requires Joint-State Agency Approval - Lack of SCE Component due to inclusion in Secondary level program, under special approved circumstances at the adult level.

*** Program leads to NYS Licensure. Program must be registered as per Commissioner's Regulations for Postsecondary Education.

2. For those agencies where circumstances appear to warrant it, the use of a laboratory simulation should be permitted in Dental Laboratory Technology and Medical Laboratory Assisting/Technology as an alternate to on-job site Supervised Clinical Experience, with approval for use of such an alternate subject to a set of minimum standards established by the Department.

3. A set of minimum standards for developing a laboratory simulation for programs in Dental Laboratory Technology and Medical Laboratory Technology should be established by the Department, with the advice and assistance of specialists in the field. It should be noted that in Appendix G are presented selected criteria for such simulation as reported by some of the respondents.

January 1980

CRITERIA FOR A SIMULATED CLINICAL LABORATORY

Barbara Pickard

Hudson Valley Community College

Introduction

The topic, criteria for a simulated clinical laboratory, will be presented, today, from the perspective of those components which are essential to, and contributory to an effective simulation of the supervised clinical laboratory experience.

The supervised clinical laboratory simulation should provide a learning experience, based upon specific objectives and also be one which results in competence in the skills required for entry level employment.

The term simulate means to take on the appearance, form or sound of; to imitate. The laboratory simulation experience does not require students tor travel to hospitals or clinics. Thus, it is an alternative to on-job site supervised clinical experience.

One must be careful to integrate and correlate the theoretical aspects of the discipline with the simulated laboratory experience.

Criteria for the Clinical Laboratory Simulation Experience

1. Faculty should: A) be familiar with the clinical laboratories in the geographic area where graduates will be employed; B) include credentialed specialists in each of the major clinical disciplines; e.g., hematology, microbiology, immunohematology, clinical chemistry, etc; C) have recent on-the-job work experience and maintain frequent liaison with clinical agencies, the "real" work environment; D) have clerical support staff available to them; E) be included in the decision making relative to the entire educational program; F) be selected from among properly credentialed individuals because they like to teach.
2. An active advisory committee should include: A) a variety of professional specialist; B) teaching faculty; C) laboratory supervisors and/or directors; D) representative of industry--(when it is appropriate to the discipline); E) students, inclusive of graduates.
3. Management should: A) promote and provide for continuing education for both faculty and students; B) provide a budget which is adequate for

the total simulation of a clinical laboratory as well as learning resources, inclusive of laboratory reference books library and media holdings supplies and equipment; C) create (simulate) a laboratory environment in which a student can imitate, as close as possible, the work performed in an on-job clinical laboratory during a normal work day; D) provide malpractice insurance, as appropriate; e.g., in laboratories where students draw blood from each other; E) continually assess and evaluate the simulated operation(s).

4. The simulated clinical laboratory environment should be carefully designed with meticulous attention to the details involving: A) appropriate furnishings and the physical properties of the material used, relative to the specific functional aspects of the space; e.g. windows or no windows, storage, benches, floors, stools, sinks, etc; B) safety features inclusive of appropriate discard areas, showers, eye wash stations, written and posted procedures for accident reporting and OSHA signs; C) selection of colors; D) music--if area employers have it in their laboratories; E) laboratories should be kept neat and clean via established custodial service and with student-faculty involvement; F) dress should be appropriate to the profession; e.g. medical laboratory students would wear a laboratory coat and closed shoes--a neat and clean appearance is essential; G) provide enough floor space to prevent crowding of students, enough bench or cart or floor space for equipment,--an instrument room adjacent to the laboratory is desirable for highly automated professions.

5. Equipment and Supplies: A) Quantity: equipment and supplies should be available in sufficient quantities so as to allow maximum efficiency in the student's use of time during his/her performance period. Efficient work patterns, and time management assessments, relative to each laboratory task (exercise), are helpful in determining the quantities of equipment and supplies needed. B) The work should be planned so as to minimize the quantity of equipment needed and to prevent waiting for equipment access. C) Each laboratory should have its own equipment. Few items can be efficiently or effectively shared; e.g., in MLT laboratories each student should have a microscope. D) Students should be taught to respect and take care of the equipment. E) Select the type of equipment and supplies most often

used by employers in your geographic area. F) Purchase from reliable manufacturers. Consider repair service contracts and the free loan backup equipment. G) Purchase the best equipment you can afford. Quality is important. H) Give special attention to the accuracy of the equipment.

6. Quality control procedures must be defined and practiced to ensure accuracy of and appropriate interpretation of results.

7. Samples and Specimens: A) should be assayed by qualified personnel in the medical laboratory because the manufacturer's assay values are not always reliable; B) should be arranged so that more than one student is performing analysis on the same sample; C) must appear as normal as possible; D) abnormal (pathologic) samples in both high and low ranges must be prepared for student assay; E) the student must be given a sufficient number of samples (normal and abnormal) so as to closely approximate the work load encountered in the on-job experience; F) STAT samples are included in the instructional scheme, to expose the student to emergency situation; G) area hospitals can provide unusual samples and specimens; H) insist on proper collection, transportation, handeling, labeling and storage of specimens, samples and cultures.

8. Record keeping should include data forms used by area hospitals, clinics, etc. In the medical laboratory, the use of log-in -- log-out procedures and proper data reporting (patient name, number), etc. by students, provide students with practice which can result in the reduction of clerical errors. To emphasize accuracy, these items should be included in the student's performance grade.

10. Problem solving should be an integral part of the clinical laboratory setting. Example: give students mislabled specimens and reports, or rig equipment to malfunction.

11. Conduct and interpersonal relationships should be carefully considered: A) Professionalism and ethics should be reinforced during each simulated laboratory session and taught by means of example as well as by means of other pedagogical methods. B) The student behavior, attitudes, ability to work with others, honesty and reliability represent some of the personal actions and qualities which need to be monitored by the instructor. C) The instructor should assume the role of supervisor. D) Reliability, an attribute which employers prize, should be

promoted; e.g. arriving on time, and good attendance.

Summary

Provided that appropriate criteria for simulation are established and utilized, the simulated clinical laboratory teaching strategy is a viable alternative to the on-the-job supervised clinical experience.

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APPENDIX

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Futuring Project Newsletter No. 5

CREDENTIALING STUDIED BY COMMITTEE

The problem of credentialing of the health occupations was studied by the Committee at its last meeting. It was recommended that New York State standardize titles of occupations to correspond with those used by professional associations throughout the country. The Committee also recommended that competencies developed by professional associations and used in other training programs be studied. It was also urged that health occupations groups be made aware that there are other ways than credentialling to achieve recognition and status, such as via certification by national groups. A recommendation to study the Health Manpower Act of California and other experimental programs was endorsed by the Committee, as was the need to build career mobility into the various health occupations.

COMMITTEE HEARS PRESENTATIONS

The Committee met in Buffalo, New York on December 11 and 12, 1980. It was addressed by Dr. Benjamin Shimberg, of Educational Testing Service in Princeton, New Jersey. Dr. Shimberg pointed out that credentialing of various kinds is sought by different groups in order to enhence their status. Devotion to such aims can, however, frequently come in conflict with the major importance of credentialing; the importance of protecting society by certifying the competence of various individuals and assuring that an adequate number of individuals in a variety of occupations is trained.

(continued on page 2)

PRESENTATIONS (continued)

The Committee was also addressed by representatives from professional associations. Dr. John Beckley of the Department of Allied Health of the American Medical Association alerted the Committee to the development of competencies in the medical area in a number of states throughout the country. Dr. Robert Dougherty, of the Commission on Dental Accreditation of American Dental Association informed the Committee of trends in the dental assistant area.

The Committee also heard from Tom Sheldon, Coordinator of Professional Education Services for the New York State Education Department, who reported on the credentialing and licensure programs in New York State. Mr. Mark Thomas, counsel to the New York Senate Health Committee, headed by Senator Tarky Lombardi, also spoke regarding trends in the legislature regarding credentialing.

Robert K. Watts, Chief Health Planner of the New York Health Planning Commission, indicated that a surplus of physicians was expected in the state by 1990. Yet Mr. Watts predicted that despite the surplus of physicians an accelerated need for allied health personnel would be likely to develop in the future.

The Committee was also addressed by Mr. Martin Delscher. Mr. Delscher discussed the possible role computers could take in training individuals in the health occupations.

INVITATION TO MEETING

The meeting will be at the Ramanda Inn, 1305 Buckley Road, Syracuse, N.Y. (313) 457-8670 on March 19 and 20 and all interested persons are cordially invited to attend the meeting on Thursday, March 19 from 9 AM to 3 PM and on Friday, March 20 from 9 AM to 11 AM. For more details of the program please contact your local editor listed on the front page.

COMMITTEE TO NEXT STUDY SPECIFIC COMPETENCIES

The problem of specifying areas of competency and knowledge clusters to be required of health occupations education program graduates will be studied by the Committee at its next meeting on March 18-20, 1981 in Syacuse, New York. The Committee will attempt to develop sets of technical competencies for each of the three major program areas: direct patient care, patient support services, and laboratory based occupations, recommended by the Committee at prior meetings. Core competencies for occupational education programs in general and for all health occupations programs were recommended in prior committee meetings.

Speakers for the upcoming meeting who will examine the specific technical skills needed for each of the three major program areas will be: Barbara Yetka from New York University Medical Center, for patient support services; Ms. Maureen Van Duser from Crouse Memorial Hospital in Syracuse, for direct patient care; and Dean Martin Rosenfeld from SUNY at Stony Brook, for the laboratory based occupations. The Committee will also hear from developers and manufacturers of medical equipment in terms of the technical skills that they foresee will be needed by the health workers to operate equipment presently in the planning stages.

February 1981

TEAR-OFF SHEET NO. 5

At its previous meetings the Health Occupations Education Review Committee recommended three broad Health Occupation clusters: direct patient care, patient support services, and laboratory based occupations. The Committee developed a central core area in which all graduates, irregardless of their cluster, should have competence, consisting of: employability skills, communication skills, interpersonal skills, organization - management of self, literacy (computer literacy, finding and using information), ethics (confidentiality, patients' rights, etc.), stress identification and management, human development and sexuality, safety, life sciences, career orientation, and costs of health care.

At the present time the Committee would like to have your input of what specific technical skills will be needed by an entry level health occupations worker in any of the three clusters, direct patient care, patient support services, and laboratory based occupations. Please fill in this tear-off sheet and return to the editor listed on the front page.

Direct patient care skills:

Patient support services:

Laboratory based occupations:

Name _____ Position _____

Address _____

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Futuring Project Newsletter No. 6

COMPETENCIES STUDIED BY COMMITTEE

At its 5th meeting the Statewide Health Occupations Education Review Committee studied the problem of what technical competencies should be taught in Health Occupations programs. The meeting was held in Syracuse, N.Y. on March 19 and 20, 1981. The Committee was addressed by a number of experts in the three program areas: direct patient care, patient support services, and laboratory based occupations. In each area the Committee heard from two speakers: a general expert, such as an administrator or college faculty member, and a representative of a firm developing products used by health occupations empioyees. Speakers had been asked to address the problem of specifying technical competencies in the Health Occupations Education program area.

In the direct patient care area presentations were made by Ms. Maureen Van Duser of the Crouse-Irving Memorial Hospital in Syracuse, N.Y. and by Mr. Michael Wardle of the American Hospital Supply Company of Glendale, California. In the patient services area the Committee was addressed by Ms. Janet Nassif, a consultant to health organizations, and by Mr. Richard Tindall of the Syracuse Brace Company. Finally, in the laboratory based occupations Dean Martin Rosenfeld of SUNY, Stony Brook and Dr. Marvin Margoshes, of the Technicon corporation of Terrytown, N.Y., spoke to the group.

May, 1981

SPEAKERS ENDORSE GENERAL COMPETENCIES

All of the speakers strongly endorsed the importance of the areas of competence previously developed by the Committee: the Occupational Education core and the Health Occupations Education cluster. A general theme running through all the presentations was that both the duties assigned to entry level health occupations personnel and equipment used by them might be particular to each setting. Both were changing rapidly and could be expected to change even more rapidly in the future. It was, therefore, considered wasteful to prepare health occupations program graduates for duties and equipment which might well be obsolete by the time they entered the work force.

The speakers urged the Committee to recommend that students be well prepared in such basic areas as employability skills, the ability to communicate effectively, being adaptable to change, understanding the workings of computers, having a realistic orientation to the world of work and having appropriate work attitudes. These areas of competency are among those that had already been identified by the Committee at previous meetings and included in the Occupational Education cluster.

The speakers also recommended the importance of a number of areas of competence subsumed under the Health Occupations cluster established by the Committee. Among these were general categories such as proficiency in medical terminology, understanding the composition and functions of the health team and the student's role in it, and a good background in those principles of biology, chemistry, and physics that apply to the health occupations. In general, the speakers de-emphasized the importance of giving instruction in very specific technical skills required for particular jobs, since both the jobs and the technical competencies are constantly changing.

The Committee discussed the presentations made by the experts and endorsed the general areas of competence in Occupational Education, and the competency clusters in Health Occupations.

SUBCOMMITTEE APPOINTED

A subcommittee was appointed to discuss some of the specific recommendations made by the experts, to study alternative curriculum structures, and make suggestions regarding the competencies to be included in such a curriculum. The subcommittees' recommendations will be presented for consideration to the entire Committee.

COMMITTEE MEETING NO. 6

The Committee will reconvene for its sixth meeting on June 4 and 5 at the Best Western Thruway House in Albany, N.Y. At that time the agenda calls for the Committee to consider the optimal curriculum structure for a revised Health Occupations Education curriculum. All interested health educators are invited to attend the meeting. Please contact your editor for the exact agenda.

REVIEW OF PREVIOUS MEETINGS

The Health Occupations Education Review Committee was appointed in order to examine the Statewide Health Occupations Education curriculum from a futurist perspective. That is, what are the competencies, skills, and attitudes likely to be required in the health occupations in the next 20 years.

At its first meeting the Committee was addressed by experts in the areas of human resources, computer application, futurists, and other specialists in the health and health occupation areas. Major themes that emerged were that there would be greater need for health occupations personnel starting with the mid 80's. First, the post-war "baby boom" generation will reach its 40th birthday, a time when demand for medical services begins to increase. Second, as people live longer, there will be a greater number of elderly persons who will require most medical services not so much for accute treatment, but for prolonged care of chronic conditions where services of health occupations personnel can be utilized. Finally, the point was made at this meeting and at a number of others, that technology was making rapid inroads in the allied health areas and that many tasks would within the next 20 years be carried out by automated equipment.

At the second and third meetings, where the group heard from personnel experts in a variety of health occuaption settings, the Committee examined the general areas where graduates of the program should have competence as they enter employment in different health services.

The Committee recommended that jobs in the Health Occupations be categorized into three large clusters (this involves a reorganization, not elimination of existing programs): 1) direct patient care, 2) patient services, and 3) laboratory based occupations. The Committee also suggested that basic areas where Health Occupations Education graduates should have competence could be centralized into several core areas. First, an Occupational Education core: Areas of competence in this core should be attained by all Occupational Education program graduates, with a view towards requiring these competencies of all occupational students. Included in this area are such topics as employability, communication and decision making skills, computer literacy and the like. The second core would consist of competencies pertinent to students in all the programs in Health Occupations Education. Topics, such as medical terminology, medical ethics, asepsis, human relations, and the like were identified as belonging in this category.

At its 4th meeting the Committee studied the problems of licensure and credentialing. The Committee was addressed by representatives from the major professional associations of this area, including the American Medical Association, the American Dental Society, and experts in the area of licensure. As a result of these presentations the Committee recommended that, to the maximum degree possible, opportunities be provided for career ladders in the health occupations, rather than preparing students merely for a particular job. In addition, the Committee recommended that routes other than licensure be considered for obtaining prestige for particular jobs. The potential negative effects of licensure on the public were also discussed.

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Futuring Project Newsletter No. 7

SIXTH COMMITTEE MEETING

The Statewide Health Occupations Education Review Committee held its sixth meeting in Albany, June 3rd-5th. Prior to the meeting the Committee completed deliberations regarding preliminary recommendations dealing with areas of competence and knowledge to be recommended for Health Occupations Education programs, shown on page 4. The agenda for this meeting included discussion of the curriculum structure for the revised Health Occupations Education program, and instructional strategies to be recommended to the curriculum development team. The Committee also endorsed a revised Health Occupations Education Program structure.

PELIMINARY RECOMMENDATIONS FOR NEW HEALTH OCCUPATIONS EDUCATION PROGRAM STRUCTURE

The Committee completed its consideration of the Health Occupations Education program structure. The figure on page 3 gives a graphic descrintion of the revised preliminary recommendations. The Committee endorsed reorganizing the existing programs into two large catagories: direct patient care and laboratory and support occupations. The specific job titles covered within each of these catagories are also displayed in the design.

(Continued on page 2)

PRELIMINARY RECOMMENDATIONS FOR NEW HEALTH OCCUPATIONS EDUCATION PROGRAM STRUCTURE

(Continued from page 1)

The Committee reaffirmed its prior recommendations that preparation should proceed in a series of core areas of competence and knowledge. All Health Occupations Education program graduates are to master the Occupational Education and Health Occupations Education cores described on page 4.

In addition, the Committee recommended that two further areas of competence and knowledge be developed: core competencies for the direct patient care and for the laboratory and support occupations. Mastery of these competencies will be required only for students within these catagories. That is, students in the direct patient care occupations will be required to master that core but not the laboratory and support occupations core.

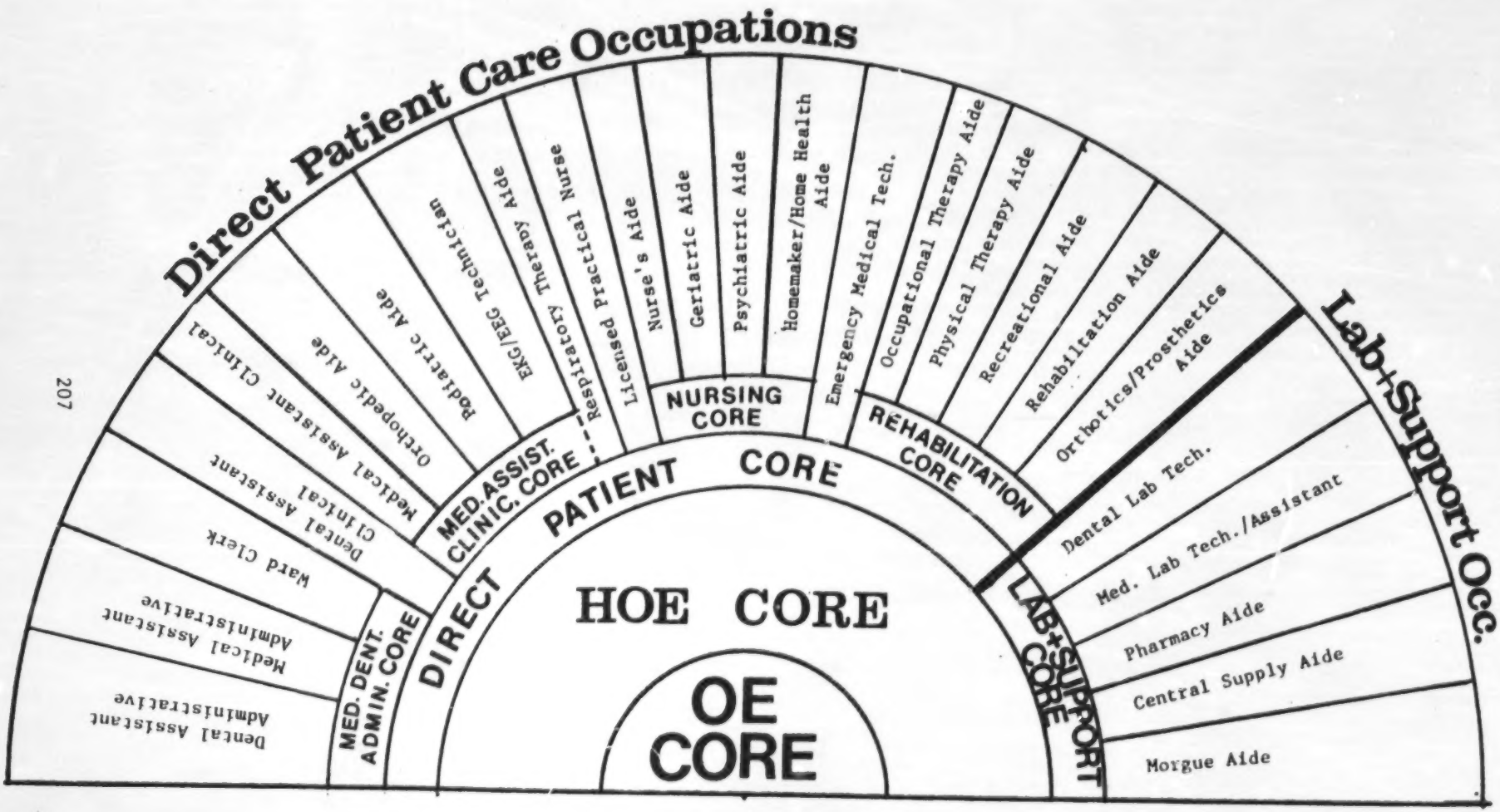
The Committee's preliminary recommendations to the curriculum development team were that small cores should be developed and shared by occupations whenever possible. Such sharing will result in obvious economies in curriculum construction. Simultaneously, they would allow students to explore a wider range of health occupations without having to commit themselves to a particular job title from the start of training. For example, after completing the core for direct patient care, the student might proceed on to the general area of rehabilitation before finally choosing one of the following occupations: physical therapy aide, occupational therapy aide, recreational therapy aide, or any of the other programs in that cluster.

INSTRUCTIONAL STRATEGIES

The Committee heard a number of presentations regarding instructional strategies found to be effective in present Health Occupations Education programs, and some that may be useful in the future. The Committee advocated that the curriculum designers use a wide variety of instructional strategies which would make the material as interesting as possible to students.

Amoung the strategies were the following: 1) Simulation. 2) "Brainstorming". 3) Computer-assisted and computer-managed instruction. 4) Role playing. 5) Inviting former students to make presentaions regarding on-the-job experiences. 6) Video tapes. 7) Teaching students how to use library resources. 8) Using real specimens in training.

The Commiteee strongly reaffirmed that the competencies previously developed should be taught in as vivd and lifelike a manner as possible. Mindful of the fact that many Health Occupations Education and Occupational Education students have reacted negatively to content which is excessively academically oriented, or "bookish", the Committee recommended that those generalizations taught be rapidly reinforced by specific, vocationally relevant examples which apply the generalizations to the field for which the student is preparing. Thus, for example, generalizations dealing with team responsibilities should be immediately reinforced in Health Occupations Education with the responsibilities of the Health team. Similarly, "hands on" experience should be used to the maximum degree possible to reinforce generalizations so as to arouse and maintaing the motivation of Health Occupations Education students. For example, when asepsis is taught, students should, as rapidly as possible, be shown how to sterilize relevant instruments. Teachers of the new Health Occupations Education curriculum should, therefore, be equally qualifies in teaching both generalizations and specific instances.



Projected Program Structure
Recommended by Health Occupations Education Review Comittee
June 1981

OCCUPATIONAL EDUCATION AND HEALTH OCCUPATIONS EDUCATION CORES

The Committee revised prior discussions of the areas or competence and knowledege in the Occupational Education and Health Education cores. The geneal catagories endorsed are displayed below in order of priority. A "1" suggests that mastery of that catagory was considered vital. A "2" suggests that mastery of that category was important. A rating of "3" indicates that mastery of that category should occur if time permitted.

The table gives the priorities the Committee assigned to the major categories. Judgements regarding priorities were made in terms of the program structure described earlier. That is, priorities were assigned to the areas of competence and knowledge in the Occupational Education Core, the Health Occupations Education Core, or in the more technical competencies. The categories shown in the table below were broken down into more specific recommendations, and a set of detailed technical competency clusters was also endorsed.

GENERAL AREAS WHERE STUDENTS SHOULD HAVE COMPETENCE

	OE	HOE	TECH
1a. Introduction to Careers in Vocational Education	1	2	X
1b. Employability Skills	1	1	1
2. Communication Skills -- Written/Verbal	1	1	1
3. Interpersonal Skills	1	1	1
4. Organization: Management of Self	2	1	1
5. Ethics	3	1	1
6. Stress	2	2	1
7. Human Development and Sexuality	2	1	1-3
8. Safety	1	1	1
9. Applied Life and Physical Sciences	X	1	1-3
10. Career Development: Contemporary Health Careers	X	1	1
11. Costs	X	2	1

OE = All students in Occupational Education
HOE = All students in Health Occupations Education
TECH = Technical level programs in Health Occupations Education

NEXT COMMITTEE MEETING

The seventh meeting of the Committee will be on September 23 & 24th at the Albany Thruway House in Albany, N.Y. At that time the Committee will consider the general purposes of Occupational and Practical Arts Education. The Health Occupations Committee will be meeting at the same time as Committees reviewing curricula in Agricultural Education, Distributive Education, Home Economics, Industrial Arts and Trade and Technical Education. These latter Committees were recently appointed in order to review curricula in their areas from a futurist perspective. All the Committees will be considering the same topic at that time.

REACTIONS

We would appreciate your reaction to the work of the Committee to date. Specifically, we would like to hear your reaction to the preliminary recommendations for a new Health Occupations Education program structure, as embodied in the figure on page 3 of this Newsletter. In addition, we would welcome your reaction to the general competency categories recommended by the Committee as described in the table on page 4. We would, also, welcome any other reactions you have had to the work of the Committee to this date. Please mail your comments to your local editor shown on the upper left hand side of the front page.

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